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BAKER OIL TOOLS, INC.

Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Texas
Export Sales Office:
19 Rector Street, New York, N. Y.

General Heading: **BAKER ROTARY WALL SCRAPER**

Unit No. **A-28**

Subject: **Scraping Cement Off Producing Zone**

Index: 250.1
Date: July 29, 1943
Page: 1

Of the many practical field applications for the Baker Wall Scraper, cleaning up oil sands is one of the most important. In such applications, the amount of actual hole enlargement varies according to the character and thickness of the substance to be removed.

Where only the mud cake is to be scraped off the oil sand, usually a cut of approximately an inch or less is sufficient. In other cases, where both cement and formation is to be removed, it may be necessary to enlarge the hole a number of inches such as in the job illustrated below.

REPORT ON BAKER WALL SCRAPER

Date 1942

Company X X X X

Field Midway, Arkansas Well and Lease X X X

Person in Charge X X X Position X X X

Depth of Well 6453' Circulating Fluid (mud or oil) Mud

Size of Casing Run Through 5½" Depth 6410'

Size of Scraper Used 2" Size of Blades 9"

Were Blades Factory Built? Yes Outside Rebuilt?

No. of Blades Used 1 pair Condition After Use Good

Nature of Formation Producing Zone

Size of Hole Before Scraping 4¾" After 9"

Distance Scraped 41' From 6412' To 6453

Condition of Scraper After Use Good

Time Consumed on Each Run 9 Hours

Was Scraper Satisfactory in Performance? Yes

NATURE OF JOB: (Check Below)

Producing:
1. Cleaning Oil Sands ✓
2. Setting Liners

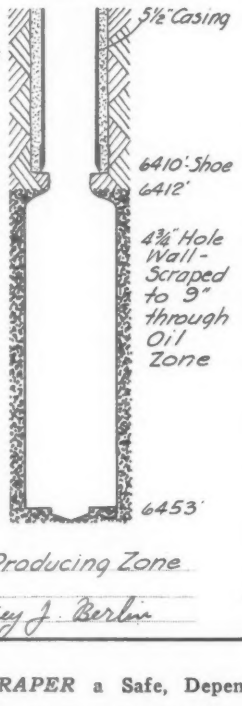
Cementing:
1. Bottlenecking
2. Setting Cement Plug

Drilling:
1. Sidetracking
2. Straightening Hole
3. Whipstocking

Running Casing:
1. Cleaning Hole to Gauge

Other Operations:

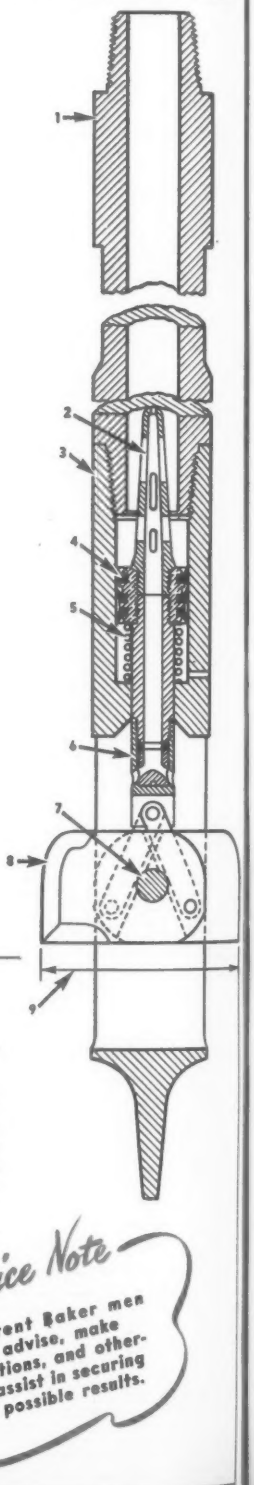
Sketch of the Job



Detail of Job and Practical Results Scraping Cement off Producing Zone

Reported By Courtney J. Berlin

Product No. 500 — ***Showing Construction Details of Baker Rotary Wall Scraper.***



Features Which Make the *BAKER ROTARY WALL SCRAPER* a Safe, Dependable Tool

(1) Double Pin Drill Collar—Connects Wall Scraper Body to drill collar.

(2) Circulation Screen—Design of cone-shaped Screen minimizes abrasive action of fluid and prevents debris from clogging circulation passages.

(3) Wall Scraper Body—Machined out of a solid piece of special alloy steel . . . provides great strength.

(4) Plunger Head—Provided with oil resistant Seals to prevent fluid by-pass and insure Piston efficiency . . . Blades will Positively Open.

(5) Plunger Spring—Strong Plunger Spring insures blades properly closing.

(6) Bushing (Circulation Bean)—Fluid is directed on each blade, lubricating and cooling cutting surfaces.

(7) Hinge Pin—Machined from solid piece of special alloy steel.

(8) Blades—Machined from special alloy steel forgings . . . afford toughness and hardness. Cutting edges are hard faced and set with Tungsten Carbide Inserts. Long bearing surface on blades minimizes "corkscrewing."

(9) Blade Expansion—Amazing reaming capacity provided by expansion range of Cutter Blades from 4" to 36".

Service Note

Competent Baker men will advise, make suggestions, and otherwise assist in securing best possible results.

For further instructions and operating details, see pages 279-287—1942 Baker or Composite Catalog.

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States—Page 251

CRUDE PRODUCTION 4,116,570 bbl. daily average—up 5,255 bbl. One year ago 3,719,915 bbl.

CRUDE STOCKS 237,440,000 bbl. as of July 17—down 1,651,000 bbl. One year ago 250,505,000 bbl.

GASOLINE STOCKS 76,565,000 bbl. as of July 17—down 1,053,000 bbl. One year ago 82,908,000 bbl.

RESIDUAL FUEL-OIL STOCKS 67,017,000 bbl. as of July 17—down 125,000. One year ago 77,015,000 bbl.

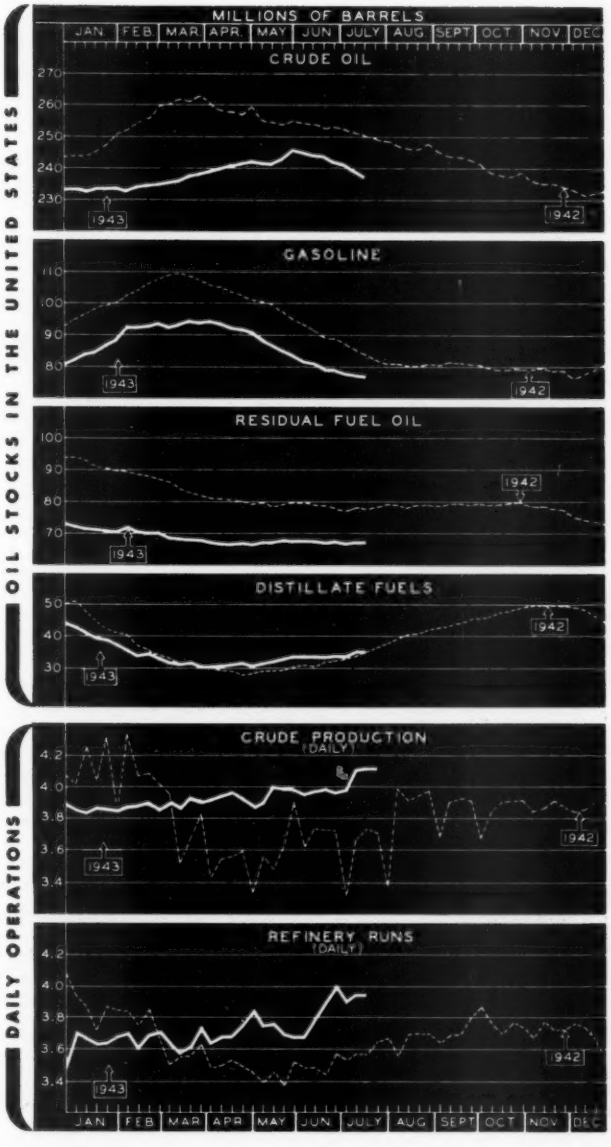
GAS OIL AND DISTILLATES 35,036,000 bbl. as of July 17—down 83,000. One year ago 35,063,000 bbl.

REFINERY RUNS 3,962,000 bbl. daily week ended July 17—up 10,000. One year ago 3,564,000 bbl.

INTEREST in the cooperative refining movement widened last week with the announcement that a group of farmer associations, most of which already owned small plants, had combined in the purchase of the third largest refinery in Kansas. The details of the purchase are explained elsewhere in this issue. Many refiners in the past have not attached special importance to the growth of cooperative refining until this purchase of the plant and important pipeline facilities belonging to one of the strongest and oldest independent refiners serving the Mid-Continent and the Middle West.

THE growth of cooperative organizations which now have 10 plants in six states has largely come in the last year and follows two decades of steady growth in the distribution of petroleum products. As explained in previous discussions, an important advantage of these associations lies in their preferred position relative to the payment of federal and state income taxes. It is pointed out that this advantage in view of the increasing tax rates and the narrow margins with which refineries normally operate is highly important particularly in the case of the smaller independent units. Observers this week are pointing to other conditions which are favorable to the cooperative operations in refining and marketing. The dwindling crude-oil supplies in Kansas, Oklahoma and the Middle West present a serious problem to many independent refiners who through the years have been able to cope with numerous operating difficulties but who have no solution to a situation in which they can't get crude oil in sufficient quantities to operate their plants efficiently. The rapidly increasing sales of the farm bureaus have also tended to restrict the market outlets of these refiners.

THERE are other observers who feel that the cooperative movement has already gone far enough to have considerable importance in the operations of the petroleum industry generally. It is pointed out that these associations are strong politically, nationally and in the states in which they operate. This fact, it is contended, could be a factor in the future distribution of crude-oil supplies including the prices paid for the crude oil. One veteran refiner has predicted that this cooperative development will tend to end the wide discrepancies that have prevailed for short periods in the past between the posted prices for crude oil and the refinery return on products.



Texas Operators Report Ability to Increase Production Nearly 500,000 Bbl. Daily

Unofficial estimates of Texas' additional producing capacity indicate that the state could, under extreme urgency, increase its output between 400,000 and 500,000 bbl. daily. This report shows the conclusions and some of the individual-field recommendations by Railroad Commission and company engineers on a part of the areas covered by the current series of hearings.

AUSTIN, Tex.—Capacity to produce 400,000 to 500,000 bbl. daily in excess of current allowables for Texas fields over a sustained period of at least a year was indicated here this week on the basis of engineering data placed in the Railroad Commission record. The commission this week concluded a series of hearings concerning capacities of individual fields in various sections of the state.

An impressive list of top production engineers, proration authorities and individual operators testified before the commission. There were occasional wide variations in the opinions of witnesses concerning capabilities of individual fields. In practically all cases certain reservations were involved such as provision of greater pipe-line capacity, installation of pressure-maintenance equipment and additional drilling to sustain the testimony.

Seeking Maximum Figures

Commissioners repeatedly reminded witnesses that they were seeking the actual capacity of the various fields to produce oil and, so far as this particular series of hearings was concerned, were not interested in the desirable rates of production. The commission made it clear that capacity production was undesirable in most instances. But as the responsible petroleum agency in Texas the commission wants to determine the maximum volume of oil production which could be obtained if developments in the war require such operation.

An arbitrary compilation of estimates presented at various stages in the first week of the hearings indicated that 29 Southwest Texas and Gulf Coast fields could produce approximately 118,290 bbl. daily above current allowables. The compilation includes an average of the mean and extreme estimates on the Tom O'Connor field and an average on the Rincon field where pipe-line outlet was the chief limiting factor.

Remaining to be considered are the numerous flush fields in the West Texas Permian basin, additional fields in the Gulf Coast and those in North Texas and East Texas. Commissioners previously went on record that West Texas fields alone could produce 250,000 bbl. daily in excess of current rates. Thus, from the fields examined at last week's hearings plus West Texas, the state would appear to have a reserve producing capacity of nearly 375,000 bbl. daily.

Among witnesses appearing at commission hearings were these heads of proration departments, production engineers and operators: W. E. Hubbard, Humble Oil & Refining Co., Houston; C. M. Whitmore, Stanolind Oil & Gas Co., Houston; C. W. Magalis, Luling Oil & Gas Co., Luling; Nat G. Haseltine, Sun Oil Co., Dallas; Jim Woodward, Magnolia Petroleum Co., Dallas; R. G. Rice, Chicago Corp., Corpus Christi; H. M. Livezey, Plymouth Oil Co., Houston; Tobe Krandel, Sinclair Prairie Oil Co., Houston; O. G. McClain, Southern Minerals Corp., Corpus Christi; J. P. Malott, Continental Oil Co., Houston; Harold Decker, Seaboard Oil Corp., Dallas, and J. R. Van Slyke, Magnolia Petroleum Co., Dallas.

A prediction that Texas would be asked to supply even larger volumes of crude oil in September was made during the week by Col. Ernest O. Thompson, member of the commission. He summed up the background and probable future developments this way:

"The hearings we have had on availability of crude oil from existing wells and fields in Texas have shown that the fields heard from thus far can produce more than 100,000 bbl. of oil daily in excess of the allowables assigned them for August.

"This is all sweet crude.

"Thus far we have heard from about half of the sweet-crude producing fields. These fields heard from so far are all located in the Gulf Coast near tidewater and crude from them can be made available with a minimum of rearranging or new construction of pipe lines to market.

"We have yet to hear from West Texas, North Texas, East Texas and the Panhandle.

"The inquiry we are making is an opportunity for the operators of any field to show by engineering data their physical ability to produce more oil without injury to the field.

"Most oil states have not been able for months to produce the quota assigned them by the PAW.

"Texas is being called upon to fill these shortages. The shortages have heretofore been made up by withdrawal from storage but oil stored aboveground has been reduced to just about the minimum working stocks. For example, it requires 6,000,000 bbl. of oil just to fill the big 24-in. line just completed to the east. This pipe-line fill is constantly required. You must put a barrel into the Texas end in order to get a barrel out of the eastern end of the line. So here is 6,000,000 bbl. of oil in just one pipe line that is not available for use.

More Increases Expected

"In July Texas was asked to furnish 125,000 additional barrels of oil per day and for August Texas was assigned an additional 90,000 bbl. daily over and above the July demand.

"Doubtless for September Texas will be called upon for another big increase. We are getting ready to meet that demand," he concluded.

Testimony was given that increases were possible in Agua Dulce, Conoco-Driscoll, Stratton and Richard King fields, Nueces County; Garcia, Guerra, Rincon, Sun and Yturria, Starr County; Glenn, Webb County; Seeligson, Jim Wells County; East White Point, San Patricio County; Sejita, Duval County, and Colorado, Jim Hogg County.

Fields which operators said are now producing at or above the optimum rate expected for the next 12 months are Plymouth in San Patricio County and Fitzsimmons in Duval County.

Biggest increases were recommended for the Seeligson and Stratton fields. With a present calendar day

allowable averaging 3,786 bbl., estimates of peak production without waste from Seeligson field was 10,995 bbl. daily by Mr. Woodward of Magnolia, 12,000 by Mr. Hubbard of Humble, and 9,000 to 14,000 by Mr. Haseltine of the Sun company. The latter two forecasts were based upon additional development of the field within the next 12 months.

With a present allowable of 2,170 bbl. daily, Stratton field was said to be capable of multiplying its output two to fourfold during the coming year. Mr. McClain of Southern Minerals said existing pipe-line outlets can handle the production if the per well allowable is hiked from 24 to 50 bbl. daily. Humble computed that 9,500 bbl. daily average would be possible with normal development during the 12 months and Mr. Rice of the Chicago Corp. said 7,140 bbl.

Agua Dulce Near Optimum

Agua Dulce's present allowable of 75 bbl. per well and 6,346 bbl. daily for the field, witnesses said, is the top desirable rate under present reservoir conditions, but six operators said the field could furnish 100 bbl. per well in an emergency. The smaller Sun field, with four wells producing a total of 220 bbl. daily, ought not to be increased under ordinary conditions, according to Mr. Haseltine, but might make 300 bbl. per day.

Agreements prevailed that increases could be allocated safely in several other fields. These were Conoco-Driscoll, now producing at a rate of 2,900 bbl. daily, said by Mr. Malott of Continental to be capable of 4,000 bbl. daily; Glenn, with a gross allowable of 1,814 bbl. daily at a rate of 18 bbl. per well, said to be capable of 25 bbl. per well.

Increasing the East White Point field, witnesses said, would depend upon installation of repressuring equipment. Its present allowable is 11,000 bbl. daily. On the basis of present conditions, Humble recommended a cut to 10,000 bbl. and Sun 6,500. Mr. Livezey of the Plymouth company suggested that repressuring operations would make possible doubling the present output and Mr. Krandel, of Sinclair Praire, said the optimum rate of production is 15,000 to 16,000 bbl. a day.

No operator recommended additional production for the Plymouth field, which now has 9,460 bbl. daily. Humble predicted that the average rate for 12 months should be 6,000 bbl. daily and both Sun and Plymouth representatives said the present allowable is the peak capacity. For Fitzsimmons field, the Sun company said production should be reduced from the present rate of 1,509 bbl. daily to 1,130.

Operators would not recommend increased output for at least five pools in Jackson County. These were Harmon, West Mauritz, Mayo, Stewart, and North La Ward.

Mr. Hubbard of the Humble company recommended a cut in the present producing rate of Lolita pool in the same county.

Recommendations for increases ranging from a few hundred to a few thousand barrels daily were made for Jackson County's Maurbro, West Ranch and Ganado deep areas.

Mr. Decker of the Seaboard Oil Corporation also suggested that production could be increased slightly in the Odom field in San Patricio County.

Mr. Van Slyke, representing Magnolia, estimated the present 17,500-bbl. daily rate of production in the West Ranch pool could be boosted to 23,130 bbl. daily without waste or damage to the pool. Humble's representative set the field's peak at 25,000 bbl.

Mr. Hubbard also said the Maurbro pool's producing rate of 1,100 bbl. daily could be increased to 1,500 bbl., in his opinion.

The Ganado Deep's current 1,485-bbl. production daily, Mr. Hubbard estimated, could be increased to 1,800 bbl. without waste.

Present Lolita field production is 5,390 bbl. daily, which Mr. Hubbard suggested be cut 1,400 bbl. to 4,000 bbl.

POSSIBLE INCREASE IN PRODUCTION
(Figures in barrels daily)

Field—	
District 2—Southwest Texas	
Maurbro	400
West Ranch	7,500
Ganado Deep	500
North La Ward	150
Greta	6,500
Placedo	1,800
East Placedo	300
Tom O'Connor	*35,000
McFaddin	1,200
La Rosa	3,900
Jay Welder	50
Greta Deep	100
Total	57,400
District 4—Southwest Texas	
Odoms	380
Conoco Driscoll	700
Garcia	80
Glen	500
Richard King	400
Rincon	†2,250
Seeligson	8,600
Stratton	6,000
Guerra	170
Sejita	430
Colorado	1,200
Yturria	200
North Sun	380
Total	21,290
District 3—Gulf Coast	
Anahuac	4,000
Clear Lake	2,000
Conroe	11,500
Coletto Creek	2,300
Total	19,800
Total three areas	118,290

*Average of mean and extreme estimates.
†Average, depending on pipe-line outlet.

Forty-Five Witnesses Called to Testify on Synthetic Petroleum

WASHINGTON, D. C. — Forty-five scientists, industrial executives and officials of Government and the military services have been asked to testify before the Senate western minerals committee which next week will start investigation of synthetic-petroleum resources.

The committee, headed by Senator O'Mahoney of Wyoming, will open hearings on various aspects of the supplies of synthetic petroleum in Washington August 3. The committee will take additional testimony later next month at Pittsburgh, Pa., where the Bureau of Mines operates an experimental plant for hydrogenation of coal. Before summer is over, the committee will convene hearings at Salt Lake City and Sheridan, Wyo.

Fourteen witnesses have been called from the Petroleum Administration for War, the Bureau of Mines and the U. S. Geological Survey, headed by Secretary of Interior Ickes.

Brig. Gen. W. E. R. Covell, chief of the Fuels and Lubricants Division, War Department, and Rear Adm. H. A. Stuart, director of Naval Petroleum Reserves, will testify for the military services.

Representatives of industry scheduled to testify are:

Milton H. Fies, vice president, DeBardeleben Coal Corp.; R. E. Wilson, president, Pan American & Transport Co.; Frank A. Howard, president, Standard Oil Development Co.; H. K. Neuwenhuis, general manager, Internation Hydrogenation Patents Co.; Fred Denig, vice president and director of research, Koppers Co.; Gustav Egloff, director of research, Universal Oil Products Co.; Paul D. Foote, director, Gulf Research & Development Co.; Warwick M. Downing, Denver, Colo., attorney, and J. P. Williams, Jr., president, Koppers Co.

Gulf Oil Takes Option On McCarthy Acreage

HOUSTON, Tex.—A 20-month option has been obtained by Gulf Oil Corp. to purchase from Glenn H. McCarthy, independent oil operator of Houston, acreage in the Stowell and North Stowell fields, Jefferson County, Texas. In the agreement, Mr. McCarthy gives Gulf 20 months' option to buy acreage "as in a contract made May 26, 1943." The deal is reported to involve payment by Gulf of $3,000,000 to Mr. McCarthy.

It was also reported that Gulf agreed to pay $32,000,000 in the event the option was exercised.

PAW Creates Division to Broaden Use of Allied Oil

by Henry D. Ralph

WASHINGTON, D. C. — Development of a coordinated petroleum-supply program on an international scale to meet the military and essential civilian requirements of the United Nations was assigned last week to a new division in the Petroleum Administration for War.

The new PAW unit is the Program Division headed by Stewart P. Coleman, director, who has been on leave of absence since the spring of 1942 as director of the department of economics for Standard Oil Co. (New Jersey). Mr. Coleman has been actively engaged in the oil business for 23 years.

Since entering work related to the war, Mr. Coleman has been on full-time assignment as chairman of the subcommittee of the Petroleum Industry War Council's economics committee. He resigned from the PIWC post when he was drafted by PAW to head the new Program Division.

Joined Humble in 1920

Coleman joined the Humble Oil & Refining Co. in 1920 after receiving the degree of chemical engineer from Rice Institute in Houston. Later, during leaves of absence, he was awarded the degrees of master of science and doctor of science by Massachusetts Institute of Technology.

In 1933 he resigned as director of refinery research and technical work for the Humble to join the Standard of New Jersey as director of manufacturing coordination. In 1940 the department of economics was established by the Standard of New Jersey with Mr. Coleman as the first director.

He has a wife and two children and served in the infantry as second lieutenant during the last war.

Duties of the new division were outlined by Ralph K. Davies, deputy petroleum administrator.

"As the United Nations shift to the offensive on a global scale," Mr. Davies declared, "petroleum becomes the most important single commodity required by our armed forces, its tonnage approximating the total tonnage of all other war supplies combined.

International Problem

"Both the military operations and the accompanying petroleum-supply problem are international in scope and it becomes increasingly necessary to develop a tightly knit and thoroughly coordinated petroleum-supply program to meet the military and essential civilian requirements of the United Nations.

"The new division, after review and consultation wth the economics committees of both the Petroleum Industry War Council (representing domestic oil operators) and the foreign-operations committee, will report on suggested program alternatives for execution by PAW.

"The Program Division will absorb part of the work and act as a clearing house for the remainder of the activities hitherto carried on by the programming sections of the PAW functional divisions. Formerly these activities were coordinated through inter-divisional liaison."

Recommendation for such a programming unit as is now established within PAW was made at the regular July meeting of the PIWC.

Creation of the Program Division apparently is PAW's reply to a suggestion from PIWC that total petroleum resources of the United Nations should be employed more effectively in fighting the global war.

Criticism at some stages of the discussion concerning military requirements of the United Nations was leveled at failure of the armed forces and other government agencies to make greater use of foreign petroleum supplies. Most of the oil supplies for all theaters of war have been drawn from the United States, intensifying the shortages which are developing in various sections of the country because of the heavy withdrawals, restricted economy and other regulations imposed on the industry.

The new PAW Program Division, creation of which is described in this report, has the duty of coordinating Allied oil supplies in order to make maximum use of productive capacity, refining facilities and tanker transportation.

White House Takes Hand in Oil Study

WASHINGTON, D. C. — Increased development of petroleum sources in foreign countries to relieve the strain on the United States in supplying the bulk of the United Nations' oil needs may be undertaken by the administration as the result of a series of actions occurring recently.

President Roosevelt discussed the matter at the White House with Secretary of the Interior Ickes, Secretary of State Hull, Secretary of the Navy Knox, Under Secretary of War Patterson, and Herbert Feis, economic adviser to the secretary of state. The conference was described as concerning "petroleum reserves in relation to the war and petroleum demands for the duration of the war," but no details were revealed.

The Petroleum Reserves Corp., newly formed as a subsidiary of the Reconstruction Finance Corp., has been transferred to the Office of Economic Warfare which the president created 2 weeks ago when he abolished the Board of Economic Warfare in order to terminate the controversies between BEW and the various financing agencies operating in the foreign field which came under the RFC and Secretary of Commerce Jesse H. Jones.

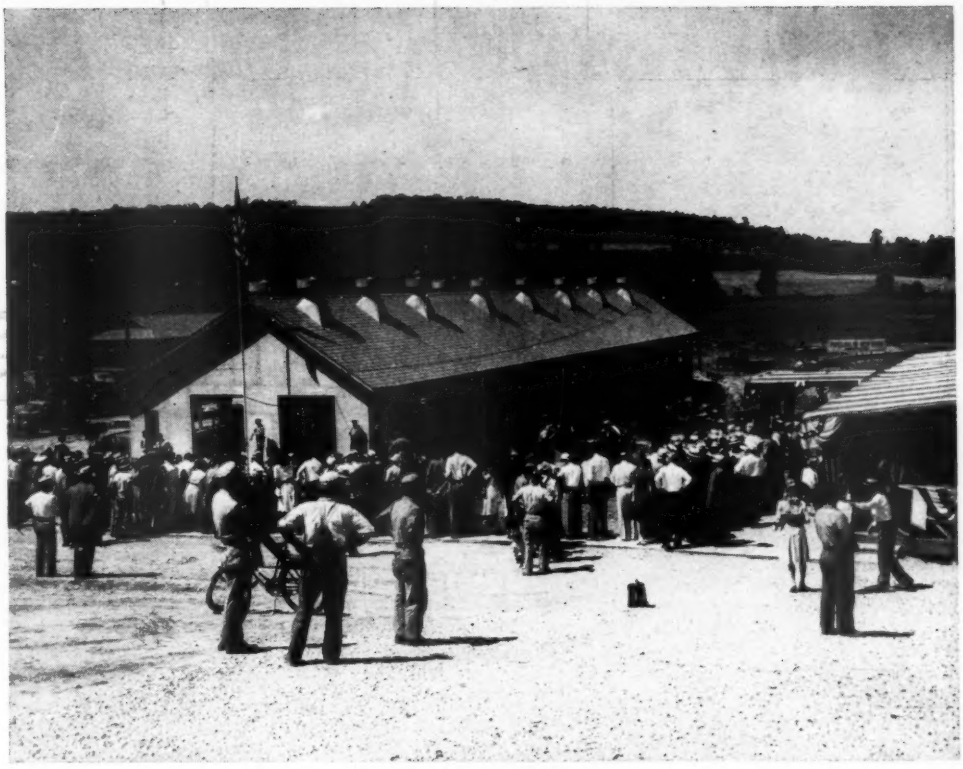
The Petroleum Reserves Corp. has not yet conducted any business abroad so far as can be determined, but is prepared to go into the oil business in any part of the world outside of the United States.

The presumption was that the White House conference dealt with the possibilities for developing petroleum supplies in areas nearer to the actual theaters of war in order to shorten transportation and supply lines.

Names of Two Oil Pioneers Assigned to Liberty Ships

OLEAN, N. Y. — Two new Liberty ships under construction for the U. S. Maritime Commission at a shipyard in Baltimore, Md., have been assigned the names of Col. Edwin L. Drake and Orville P. Taylor, pioneers in the oil industry.

The suggestion that Liberty ships be named for these two oil trail blazers was made to the Maritime Commission some months ago by John P. Herrick of Olean, N. Y., and endorsed by the oil-region press, oil associations, prominent oil men, and public officials.



High government officials, oil company executives and pipe liners are blended into this group assembled at Phoenixville, Pa., last week to hear and see ceremonies marking official completion of the big-inch line to the East Coast. In the right background is a sign designating the New York leg of the system which branches at this point. One branch goes to Philadelphia and Marcus Hook

THIS WEEK

REFINING—Five farm cooperatives join forces to acquire Globe Oil & Refining Co. plant at McPherson, Kans. . . . Purchase includes 229-mile, 6-in., refined-products line running to Council Bluffs, Iowa. . . . New acquisition increases capacity of cooperatively owned refineries in this country to 40,000 bbl. daily. . . .

PRODUCTION—Kentucky Oil and Gas Association told year's end production requirements may rise to 4,750,000 bbl. daily. . . . ¶Texas productive capacity may range from 400,000 to 500,000 bbl. daily above current allowable. . . . Railroad Commission record shows 25 Southwest Texas fields and 4 on Gulf Coast could raise output nearly 120,000 bbl. daily, leaving West Texas, North Texas, other Gulf Coast areas and East Texas yet to be tabulated. . . .

MARKETS—PAW's Don Knowlton thinks relief in higher price ceilings will come in 30 to 60 days. . . . ¶Local advances so far permitted by OPA raise over-all average of crude only 2 cents per barrel. . . . ¶Product prices steady at unchanged levels. . . .

SUPPLIES—East Coast index rises to 35 per cent of normal. . . . Lifting inventory to satisfactory level for entering winter months proving tedious task. . . . ¶OPA asserts passenger cars in eastern shortage area are consuming 66 per cent fewer gallons of gasoline, that distribution is within allocated supplies. . . .

ADMINISTRATION—PAW creates new Program Division, headed by Stewart P. Coleman, former chairman of PIWC economics subcommittee and previously chief of Standard of New Jersey economics department. . . . Duties embrace long-range, international programming of supplies, balancing them with military requirements. . . . Objective is to fit foreign supplies into general scheme of military affairs, reduce currently heavy drains and prospective heavier withdrawals from this country. . . .

MATERIALS—Supply picture looking brighter than at any time since war started. . . . Further improvement in prospect. . . . Changing material outlook reflects spreading knowledge that development operations were keyed too low. . . . War agencies relinquishing some of previously urgent claims on critical materials. . . . Vacillating war picture easing critical-metal supplies here, tightening up there, BUT broad outlook is for increasing diversion to industry, as more and more armament objectives are reached. . . .

TRANSPORTATION—First big-inch crude expected at East Coast terminals about August 8. . . . ¶Tank-car shipments decline slightly. . . . Diversion of 100,000 bbl. daily of big-inch oil to line-filling service frees cars for longer hauls, cuts down total transportation capacity. . . . Most of the 10,000 to 11,000 cars previously hauling crude from Norris City to eastern refineries will be assigned same run when 20-in. line reaches Illinois. . . .

Supply Companies' Position as Sponsors of Development Improved by OPA Ruling

SUPPLY companies are authorized to make reasonable charges for financing equipment purchases by operators and to cover profit on certain types of emergency transactions. This general ruling, with qualifying and specific limitations, has been issued by the Office of Price Administration both in formal interpretations and in private correspondence with Mid-Continent supply firms.

Several questions arose in the operations of supply companies under ceiling-price requlations, chiefly concerned with charges for services to credit customers. Normally, supply companies added a charge to credit customers' billings for handling and financing purchases from other equipment concerns which permitted no discount. Some supply companies interpreted OPA regulations to prohibit such charges and as a result credit services either were suspended or carried at a direct loss.

Fears of some supply companies that OPA price regulations prevented them from rendering certain services and from just compensation for credit risks are dispelled by this account of policy. Hypothetical cases of supply company and customer relations are interpreted by OPA, showing how equipment concerns can continue their normal role of sponsor and supporter of exploratory and development operations.

Typical Cases Interpreted

In typical hypothetical cases summarized below, the OPA has issued specific interpretations.

Case 1: In which a supply company purchases for a credit customer's account equipment not in the concern's regular line and on which there is no dollars-and-cents ceiling price.

Interpretation: In such instances, if it was the supply company's practice to use a markup or handling charge before price limitation, then the company is permitted to use the same markup at present. In most cases where such a markup is used, a report to the OPA is necessary. A copy of the supply company invoice will fulfill this reporting requirement. It is also necessary to have a statement on file with OPA describing the markup practice used prior to price limitation.

Case 2: In which equipment regularly handled by the supply company is now out of stock, necessitating emergency purchases from a new source.

Interpretation: Section 1390.15 of Maximum Price Regulation 136 provides: "Notwithstanding any other provision of the regulation as amended, any manufacturer, seller, lessor or machinery-service supplier may add to the maximum price herein provided an extra charge in the amount of the extra out-of-pocket expense incurred for special services, either where an emergency requires that material be obtained from a source more expensive than the usual source, or where an emergency requires special handling of a machine or part after its manufacture: Provided, that such extra charge is stated separately from the purchase price in billing. Nothing in this section shall be construed to permit a manufacturer, seller, lessor, or machinery-service supplier to pay more than the applicable maximum price for any material or service."

In order to use the provisions in this quoted section, the emergency must be that of the customer rather than the supplier.

Oil Payments Exempt

Case 3: In which equipment is purchased for the credit customer's account which is covered by a definite dollars-and-cents maximum price.

Interpretation: A formal OPA ruling, issued January 10, 1943, which applies only to reusable pipe says: "Oil payments. A bona fide sale by a dealer of reusable pipe to a consumer who proposes to drill a new oil well and pay for the pipe entirely out of oil to be produced, in an amount to be determined by the productivity of the well, is not subject to the regulation."

The exemption does not apply in any case in which the purchaser is liable for the entire cost of pipe regardless of the outcome of the well. In such a case there still may be considerable credit risk involved, but this type of risk may be covered by a finance charge.

The same principle applies, in the eyes of OPA, if the pipe or equipment is new rather than used. The exemption from MPR 136 applies whenever the amount of payment under the agreement is to be affected in any way by the output of the well. Thus, if a nonproductive test means that the producer will be only responsible for part payment or merely for return of the supplies, the sales agreement is exempt; if a poor well means that payment will be stretched over a long period of time, the agreement is exempt.

OPA has assured supply companies that on any type of commodity purchased for a credit customer's account, it is permissible to make a finance charge, a risk charge or credit charge to cover a real service not provided for within the sale price of the equipment. For purposes of price control, OPA insists that the price of the commodity itself be shown separately on the invoice with other charges listed as separate items.

Service Charge Authorized

In a specific instance, one supply company filled requirements of a credit customer for pipe from lend-lease inventory purchased through a competitive supplier as representative of the Metals Reserve Corp. The representative supply company allowed no discount. OPA ruled that the purchasing supply company which acquired the pipe for its credit customer was definitely entitled to bill the operator for a finance charge because otherwise the transaction provided no profit margin to absorb costs of services rendered. The only restriction imposed by OPA in this specific case is that the finance charge must be reasonable.

The points raised by supply companies and the interpretations by OPA were prompted by the necessity for determining whether equipment concerns could continue their normal relationships in the promotion of exploratory operations. The supply companies pointed out that if they were prohibited from recovering reasonable credit risks and from making customary service charges, the price regulations would materially hamper drilling and production operations in the industry.

OPA assured inquiring supply companies that the intention is to maintain all the liberal features of credit arrangements previously existing between equipment firms and operators in order to promote drilling.

Attacks on East Texas Water-Oil Ratio Plan Seem Near Settlement

AUSTIN, Tex.—Application of the Konowa Operating Co. to transfer its oil allowable from a heavily water-contaminated lease to another property 8 miles away was pending this week before the Railroad Commission. If the application is approved by the commission and sanctioned by the royalty owners involved, the proposal may end the current fight against the Railroad Commission's water-oil ratio order.

The Konowa company is the plaintiff in a lawsuit in which the District Court judgment held the water-oil-ratio order invalid as applied to wells of the operating concern.

The application now pending before the commission asks permission to transfer allowable from five wells which are producing a high percentage of water to an uncontaminated lease 8 miles away. If the transfer is authorized, the Konowa company would close in its five water wells and thereby remove the basis on which its injunction proceedings were based against the commission.

General American Buys Winkler County Wells

DALLAS, Tex.—General American Oil Co. of Texas has purchased 25 flowing wells in Winkler County, Texas, from Ralph Lowe, of Midland, Tex., according to an announcement by A. H. Meadows, president of General American.

The consideration was $1,000,000, of which $375,000 was cash.

Texas Co. Posts Gravity Price Table for Slaughter

The Texas Co. last week posted a gravity table of prices for crude purchased in the Slaughter field of Cochran and Hockley counties, West Texas, retroactive to July 1.

The new postings are: Below 20 gravity and up to and including 23.9 gravity, 78 cents, with an increment of 2 cents for each degree of gravity up to a top of $1.04 for 36 gravity and higher.

Expansion of Canadian Plant Near Completion

LETHBRIDGE, Alta. — Extensive alterations to the Huff refinery here, taken over by Pacific Oil & Refining Co. of Alberta, will be completed some time in August. Capacity of the plant is being considerably increased.

Federal Order Digest

PAW Actions

New Division—Establishes Program Division, under Stewart P. Coleman, director, for the purpose of developing a tightly knit and thoroughly coordinated petroleum supply program, international in scope.

OPA Price Regulations

Coke — MPR 121, Amendment 20: Provides system for producer applications for maximum price adjustment when receipts from sale of their entire production at ceiling prices do not equal total costs of production, effective July 28.

Catalysts—RSR 1, Amendment 21: Removes price-control regulations from all catalysts sold for use in manufacture of synthetic rubber, aviation gasoline and toluene from petroleum, effective July 27.

OPA Rationing Orders

Fuel Oil — RO 11, Amendment 72: Specifies withdrawal of fuel-oil inventory coupons by August 31; effective August 16 no fuel oil may be transferred in exchange for inventory coupons now outstanding, effective July 24.

Tires—RO 1A, Amendment 42: Replaces three difference forms of tire certificate with one form of simplification, reducing paper work for rationing board, tire dealer and consumer, effective July 29.

Tires—RO 1A, Amendment 43: Provides system for having applications from operators of commercial vehicles reviewed by tire experts in the larger areas, with OPA designating one local board as the Truck Tire Board, effective July 29.

Gasoline—RO 5C, Amendment 67: Allows ration holders to use B, C, E and R coupons beyond the fixed expiration date until coupons are exhausted, regardless of "expiration dates," effective July 24.

Gasoline — RO 5C, Amendment 69: Provides rules for eastern motorists in exchanging A coupons for B's which can be used outside the eastern rationing area, effective July 23.

Gasoline — RO 5C, Amendment 70: Permits employes in war plants and other industrial establishments to surrender unused supplemental rations to their organization's transportation committees, rather than to their War Price and Rationing Board, effective July 31.

WPB Regulations

Toluene — AO M-34, amended: Changes designation from GPO M-34 and authorizes laboratories to accept deliveries of 5 gal. or less of toluene in the aggregate from all suppliers in any month, issued July 23.

Benzene — AO M-137, amended: Changes title from CO M-137 and requires manufacturers who use less than 50 gal. of benzene a month to certify to the supplier and the WPB that they are not using more than that amount, effective July 23.

Carbon Black—AO M-244, amended: Relieves manufacturers from previous requirement for a specific allocation from WPB for quantities of furnace-type carbon black between 100 and 5,000 lb. in any month, effective July 20.

Beck Made Chairman of Kansas Oil Commission

EMPORIA, Kans. — Clarence V. Beck, former attorney general of Kansas, has been elected chairman of the Kansas Corporation Commission, the petroleum regulatory agency of that state. He was appointed a member of the commission June 28, and earlier this month was elected chairman.

Before serving as state attorney general from 1935 to 1939, he practiced law in Emporia and later served as a member of the School Retirement Board. While attorney general, he served as vice president of the Interstate Commission on Crime.

Oil Compact Commission Adopts Educational Plan

WICHITA, Kans.—Plans for a petroleum-industry educational campaign were approved here last week by the executive committee of the Interstate Oil Compact Commission which also selected Santa Fe, N. M., as the city for the next quarterly meeting September 24 and 25.

The committee contracted to produce a 30-minute sound and color movie, "Oil for Tomorrow," which will portray modern methods of finding, producing and conserving petroleum.

Material will be gathered from most of the oil-producing states. The commission plans to distribute the film among colleges, civic clubs and other groups as a means of familiarizing the public with what the industry is doing.

Charles Orr, Oklahoma City, commission secretary, said committee discussions indicated one of the major topics to come before the Santa Fe meeting would be postwar planning for both oil and gas.

Stimulant of Prices in Exploration Emphasized Before Kentucky Meeting

The local increases in crude-price ceilings authorized by OPA since markets were frozen February 2, 1942, have added 2 cents to the over-all per-barrel price of crude oil. This average figure was presented at Ashland, Ky., last week by D. R. Knowlton, PAW director of production.

by Max L. Spray

ASHLAND, Ky.—Grim warnings of the definite shortage of crude oil and of the necessity of taking immediate steps to increase production to meet ever-mounting demands of the nation's armed forces were repeated and emphasized here last week at the annual meeting of the Kentucky Oil and Gas Association.

"As long ago as January 1942 I called attention of government officials to a possible crude shortage and the resultant disaster as far as winning the war was concerned and we are facing that shortage today," declared Wirt Franklin, special assistant to the deputy petroleum administrator, in one of the feature addresses.

Similar warnings were sounded by Harold B. Fell, Ardmore, Okla., chairman of the District 2 industry production committee and executive vice president of the Independent Petroleum Association of America. He advocated an advance of 50 cents per barrel in crude-oil ceiling prices to stimulate exploration and to make profitable the operation of numerous small wells which have been shut down or are on the verge of abandonment.

Probable Production Requirements

Mr. Franklin pointed out that it may be necessary to produce 4,750,000 bbl. of crude oil daily by the end of this year but that even at the current rate of around 4,000,000 bbl., existing fields are nearly at their producing capacity.

"An increase in the price of crude oil," declared Mr. Franklin, "which will stimulate wildcat drilling, close cooperation between major companies and independent operators, plus sufficient materials and manpower will be needed at once to increase production.

N. W. Shiarella of Owensboro, Ky., reelected president of the Kentucky association along with other officers, charged that officials in Washington had ignored warnings of qualified operators and declared that Sumner T. Pike, petroleum adviser to the Office of Price Administration, is blocking efforts of Petroleum Administrator Ickes and Deputy Administrator Ralph K. Davies to secure a crude-price advance.

"To me," said the association president, "it seems that one reason why they are not granting any concessions to the industry is because some of the fair-haired boys believe that if the Government took us over that they could do a better job of operating our industry. We must put up a united front and send these economists back to their textbooks. They do not understand practical business methods," he charged.

"Prentiss Brown and Sumner Pike are only the front boys. They take their orders from someone else. We cannot expect any relief until the boys behind the scenes realize that we will fight and destroy any plans that they might have to nationalize our industry. Private enterprise and private economy can do a better job than the group of 'Quiz Kids' that are now operating close to the White House." he added.

Mr. Franklin substituted on the program for W. B. Heroy, director of the PAW Division of Reserves, who was detained in Washington to supply certain data to Fred M. Vinson, director of the Office of Economic Stabilization.

"Over 1,000,000 bbl. a day are now being used by the military forces of the United Nations," Mr. Franklin said, and added that "when the European front is in full action there is no telling what the demand will be."

He explained that in other war industries price has been a secondary consideration and that the theme is "do it now regardless of cost." He said he had been unable to understand why the price of crude oil had been frozen on a subnormal basis, and explained that prior to Pearl Harbor the price range had been below the normal level.

"I have told government officials that the foundation of the shortage problem is the price of crude oil and that if the price was sufficient there would be no critical situation.

"There is no oil on the shelf and if a price increase was granted now it would take time to explore, discover and develop. We may not have time to have the needed oil when and where it is needed by the fighting forces because the demand is mounting by leaps and bounds.

"The greatest shortage is in this district (District 2). Under the allocation to refineries we are now 70,000 bbl. a day short but the allotments of crude have been greatly reduced so the actual shortage may be upwards of 100,000 bbl. a day," said Mr. Franklin.

He compared the present situation with that of World War I and told of how a price increase then brought the needed amount of oil. He closed with a challenge to major operators to "loosen up" and assist the small independent in wildcat operations to help whip the problem of supply and assure victory in the war.

Social Planning Charged

Mr. Fell charged that there had been direct evidence of social planning in OPA. He cited David Ginsberg's records as evidence that OPA's intent is to control profits and not prices.

"The OPA is wedded to the subsidy plan but subsidy will never work as a crude-oil price substitute," Mr. Fell concluded.

Paul G. Blazer, president of the Ashland Oil & Refining Co. and chairman of the District 2 refining committee, was toastmaster at the annual dinner and also commented on the need for an increase in the price of crude oil. However, he said that the increase should be made in the price of crude oil and its products and asserted that the difficulty of handing this increase on to the consumer was the stumbling block in granting the increase.

"Money, manpower, and materials —the three M's—with money representing price—are the oil producers' problems," declared Don R. Knowl-

ton, PAW director of production. "The materials situation is brighter than it has been for a long time and prospects for further improvement are good. The manpower problem is still serious, but much can be done toward using more women in production operations. Price, in my belief, remains the real problem and I don't feel that the present situation can hold out more than 60 days longer without a change."

He said that the big task is to find new wells, to drill more wells, to use secondary recovery, to recondition old wells — anything to increase production of crude oil.

Production Problems Overshadowed

Mr. Knowlton said that for 2 years the problems of crude-oil production have been overshadowed by those of transportation and manufacture of aviation gasoline. He explained that miracles have been accomplished in increasing overland transportation facilities, that the world's largest pipe line is ready to augment tank-car and barge services and many bottlenecks eliminated.

"Local problems of supplying eastbound pipe lines and tank-car trains give rise to the need for rationing the oil-producing area in order to make supplies available for shipment East. This rationing will not be based on a shortage of transportation or a shortage of rubber. It will be based on a shortage of oil," Mr. Knowlton said.

"The operators are dissipating their assets with no chance to recover, even after the war. That is your contribution to the war program," it was said in a paper prepared by Frank M. Brewster, director, PAW District 1, Natural Gas and Natural Gasoline Division. Title of the paper was "Can the Appalachian Region Produce Enough Gas for the Coming Winter?"

The paper was read by Robert S. Hyde, an associate of Mr. Brewster, who is now ill in a Pittsburgh, Pa., hospital.

There were 2,772 wells drilled for gas in the Appalachian region during 1942, of which 2,145, or 77 per cent, were productive. The record for the first 6 months shows 1,223 wells drilled with 73 per cent productive and the trend pointing to a total gas-well completion rate that may equal that of 1942 but figures show that the peak-day demand exceeds the 1942 figure by 90,894,000 cu. ft.

Charles B. McClintock, chief, secondary-recovery unit, PAW, in a paper on "Water Flooding in the War Program," explained what the federal oil agency has done in an effort to stimulate secondary-recovery operations. He cited several instances in which the volume of secondary production has equaled or exceeded that recovered in primary stages of development.

These officers of the Kentucky Oil and Gas Association were continued in office. Front row: M. A. Arvin and N. W. Shiarella, Owensboro, Ky., vice president and president, respectively, and E. L. McDonald, Lexington, secretary. Back row: J. C. Preston, Owensboro, executive secretary and treasurer, and M. G. Powers, Huntington, W. Va., vice president. P. C. Van Gilst, another vice president, was not present when the picture was made

East Coast Index of Supplies Rises Point While Overland Shipments Increase

WASHINGTON, D. C. — A gain of one point in the stock index of principal petroleum products on the East Coast available for civilians, bringing the index up to 35 per cent or normal, was announced this week by the Petroleum Administration for War.

Commenting on the supply situation, Petroleum Administrator Harold L. Ickes said:

"Stocks on the East Coast are now at the same relative level as the average for the month of February. We have a much larger oil supply coming in every day—and equally true, we have a much larger military demand to meet. The stock level of 35 per cent of normal for today compares with an index of 52.6 for the same date 1 year ago."

Tank-car loadings for the week averaged 994,236 bbl. per day, a drop of 22,793 bbl. from last week's record-smashing high. Further decreases in tank-car loadings may be expected in the future, because as a result of the completion of the big-inch line, there will no longer be a large volume of oil concentrated at Norris City, Ill., for the short haul to the East Coast. Total deliveries, however, will, of course, be increased when the big-inch is filled and delivering oil directly to East Coast points. The tank cars released from the Norris City to East Coast run will continue bringing oil to the East but from points more distant than the Norris City terminal.

In releasing a progress report upon supplies reaching the East Coast by substitute transportation this past year, Deputy Administrator Ralph K. Davies said:

"Note that these daily overland shipments have increased 48.8 per cent over this past 12 months and also recall that they have reached the present 1,455,000 bbl. from about 100,000 bbl. in prewar times."

The transportation progress summary released by Mr. Davies follows:

Daily Average Supply of Oil to the East Coast by Substitute Transportation Methods

1942:	Bbl.	1943:	Bbl.
July	1,027,000	Jan.	1,079,000
Aug.	1,084,000	Feb.	1,125,000
Sept.	1,091,000	March	1,128,000
Oct.	1,010,000	April	1,283,000
Nov.	1,049,000	May	1,301,000
Dec.	1,028,000	June	1,368,000

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Petroleum Up to Now

IN this issue we stop, at the year's half-way mark, and look both backward and forward. In addition we have kept in mind petroleum's position, 20 months after this country's entry into the world conflict which will have its fourth anniversary at the close of next month.

This entire space could appropriately be devoted to a summary of the oil industry's numerous and vital contributions to the war. There could be no better demonstration of their importance than the departure Sunday of Mussolini from the war arena. This oldest of the enemy apostles of economic and social regimentation decided long ago that petroleum was a luxury which his people could not afford and through prohibitive taxation and other controls, he kept the prewar requirements of his 45 million peoples under 40,000 bbl. daily, a demand equivalent to that of one of our smaller states.

Because he entered the war without oil resources this wizard in bureaucracy never was a belligerent worthy of the name, and when part of the Allied war machine, whose air power will shortly be consuming 10 times the total Italian petroleum demands, arrived at his door he capitulated, to be followed shortly by a misled nation.

Petroleum is winning a war and back of that fact are activities of operators which cannot be fully described until the emergency is over. The Allied supremacy of the air which brought the turn in the war tide came from the expansion of the experimental prewar arts to the large-scale production of a superior fuel which the enemy can't duplicate in substantial quantities.

Closely paralleling this manufacturing accomplishment is the rapidly growing production of butadiene and other intermediates required in the development of the billion-dollar synthetic-rubber industry. The production of toluene has caught up with expected peak demands for explosives.

The sons and daughters of another generation will tell how their parents participated in the laying of the big-inch lines and other emergency transportation construction and operation which enabled the Allies to carry out their offensive plans without serious delay despite the loss of a large part of their effective tanker capacity.

These and hundreds of other achievements could be detailed now that they are nearing completion, and at some future date they should be.

But at this time oil operators in this country are more concerned with what they have left to do and what they have to do it with.

Demands for most of the products of petroleum expanded rapidly the first 6 months and over the remainder of the year will exceed any corresponding period in the history of the industry. In addition to the special products every expansion in the war effort has meant greater demands for petroleum and natural gas.

Outside this country in recent weeks transportation conditions have improved and Allied sources of supply are to be expanded. There will be demands for every available barrel of this oil.

Because this country is the source of more than 90 per cent of the war products and more than 70 per cent of all petroleum and because domestic operations must support the economy of this country which in turn supplies the great bulk of all Allied materials, what is happening here oilwise is of primary importance.

The obvious conclusion from a study of the first half-year is that we are not finding enough oil by a wide margin. The domestic production for the first 6 months which was less than the actual demand, totaled 709 million barrels and proven reserves credited to more than 200 discoveries including extensions to existing fields, were 437 million barrels, a relationship of 10 barrels of oil produced to 6 barrels discovered. Only 170 million barrels of this reserve were credited to new fields.

Thus the petroleum deficiency apparent since 1939 continues so far in 1943. Whereas, a year to 3 years ago, this trend could be discussed as something remote in importance, its significance is now apparent in several phases of operations. This nation is short in available oil that can be produced in accordance with conservation principles. Productivity is experiencing a general decline.

Those responsible in the Washington war agencies probably figure that oil operators can provide a remedy in an emergency program as they did in the case of aviation fuels, synthetic rubber and the transportation crisis—but they can't. Finding oil is more basic than that and it will take at least as much time for petroleum to regain its strong position in proven reserves as it did to lose it.

The only remedy lies in the drill. The government plan has been to see how little in materials and manpower could be used in exploring and producing oil. The Government wanted the oil but it hasn't wanted to pay the price, a war-production policy which is confined to the petroleum industry.

To have protected this country in its most essential war material and its greatest asset in the postwar period, petroleum should have been placed in the same priority class as airplanes, ships, motor transportation and ammunition, and drilling given the materials required to maintain reserves.

This fact will be brought closer to every American later this year and next. The inevitable result of a short-sighted supply policy in petroleum is more rationing for civilians.

Now a word about price which isn't boring to oil operators but has been to a cycle of price administrators and their staffs whose attitude is reflected in the market-review data of this issue. Despite all that has been done so far this year by every branch of the industry, price ceilings generally are the same as they were at the start of the year with little change since the fall of 1941.

Practically every major factor entering into the production of crude oil has increased but, except for scattered advances affecting less than 10 per cent of the total output, crude-price schedules are unchanged. The latest report of the Department of Labor shows the petroleum and products index at 62; all commodities, 103.7; farm products, 123; foods, 108.4 and metal and metal products, 103.7.

Compared to August 1939, which witnessed the start of this world war, all commodities have increased 38.3 per cent; farm products, 103.1 per cent; foods, 61.2 per cent; and petroleum, 19 per cent.

The situation in regard to the search for new oil is indicative of how higher costs have come to the industry. When the industry over a period of years was finding more crude oil than it was producing and was building up its reserves, representative reports indicated that the cost of finding a barrel of crude oil was approximately 25 cents. This covered geology, wildcat drilling, leasing, and many other exploratory expenses.

The increased expenditures of the past 2 years and the meager returns indicate that these exploratory costs have doubled for the industry as a whole, a situation that requires special consideration in the matter of price if the needed expansion in exploration is to be an accomplished fact.

Profits of the industry decreased substantially in 1942 and further declines are assured for this year based on present markets. In this connection it should be kept in mind that restrictions in operations and increases in the allowable output often tend to expand earnings for a limited time.

Successful operators return a substantial part of their income to the drilling of wells and to the modernization and maintenance of existing properties. They have not been able to do this on a normal basis over the past 20 months. Furthermore, they are accustomed to operate in accordance with efficient practices, keeping in mind the necessity of securing the largest ultimate recoveries. Increasing allowable production per well in many instances has added to recent earnings but it violates the principles on which permanent operation is based.

There are those who, with reason, have become discouraged in their efforts to secure consideration for these and other conditions involving materials, manpower, transportation, and price. The case is clearer now than it has ever been and there is reason to believe that its continued presentation not only at Washington but to the public at large will shortly bring an end to official inaction.

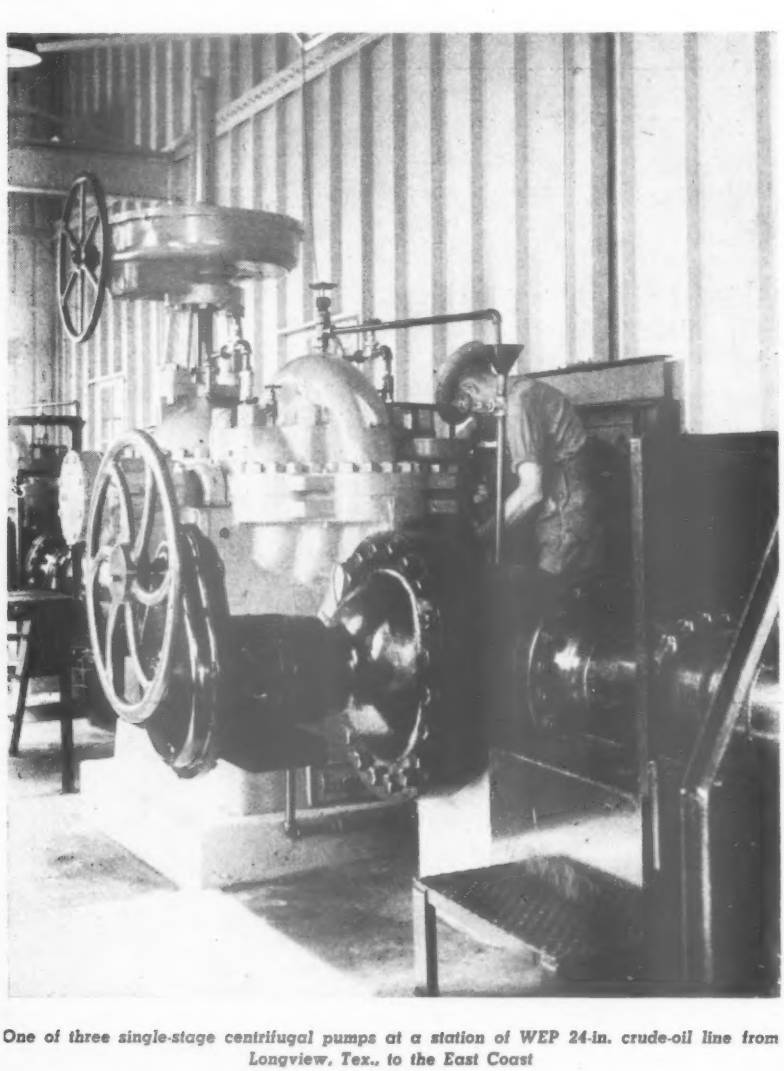
Status of WEP Program

by Paul Reed

IMMEDIATE as well as future prospects of the War Emergency Pipelines, Inc., program have been widely discussed by major oil company executives during the last week. At the same time the significance of the undertaking is being more correctly appraised.

Crude oil being pumped eastward from Norris City, Ill., filling the line at the rate of 100,000 bbl. per day and moving at a rate of 40 miles per day passed the Lebanon, Ohio, pump station July 23 and is now in the vicinity of the Uniontown, Pa., station. It is due to reach its East Coast destinations on August 8. In addition to the air-pressure tests conducted ahead of the stream, the line is being further tested between stations by raising pressure of the oil to 500 to 700 lb. Results have been satisfactory.

In the 10 days following diversion of oil into the eastern extension, tank-car shipments from Norris City, July 15 to 25, averaged 600 cars daily. This movement together with shipments via Enfield and oil for filling the line mean that the WEP line is operating close to the schedule for this transition period of moving between 270,000 to 280,000 bbl. daily. The schedule for July calls for moving a total of 8,928,000 bbl., consisting of 5,208,000 bbl. of East Texas crude, 1,240,000 bbl. of Southwest Texas crude and 2,480,000 bbl. of West Texas crude. In August, these three grades are due to be moved in approximately the same proportion with a higher total of 9,300,000 bbl. for the month.



One of three single-stage centrifugal pumps at a station of WEP 24-in. crude-oil line from Longview, Tex., to the East Coast

In the interval which will elapse between the complete filling of the 24-in. oil line to the East Coast and the completion of the 20-in. products line to Norris City, there is likely to be need for some tank-car movement of crude for a short period while pump stations on the eastern extension are being completed, and before the terminal facilities at Norris City are prepared for handling refined products. As soon as refined products reach Norris City through the 20-in. line from the Gulf Coast which is due for completion that far early in September, nearly the same number of tank cars will be required for moving these products eastward as are now moving big-inch crude. But since the products sent through the 20-in. line will shorten the tank-car haul for this movement, additional tank cars will be available for increasing shipments to the East Coast.

Frequent Changes Inevitable

The building of lines for the WEP program has been affected by frequent changes in the Army and Navy plans which are inevitable in conducting war on a scale of increasing magnitude. Conditions were far from normal where careful provision can be made for future needs.

From plans for the original line expected to handle one grade of crude, WEP executives were required to make provision for handling both heating oil and crude and finally they were given a program for handling three grades of crude separately.

Although the present plan of batching gasoline and heating oil through the same line presents operating difficulties, it is reported that the arrangement now contemplated for the 20-in. line is the most practical under the circumstances. Kerosene slugs may be used between tenders. It will probably be some time after the 20-in. is completed before shipments of 100-octane gasoline will be sent through the line, owing

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to the status of the Gulf Coast refinery program.

For a time it appeared as though the WEP program would be further complicated by a proposal to build a terminal at Seymour, Ind., which now has been definitely discarded as impractical from the standpoint both of pipe-line and railroad operation.

Although there has been inevitable interference in operation due to mechanical dfficulties, these have not actually impaired the over-all effectiveness of the Longview-Norris City line to date. Aside from restrictions of the throughput owing to interference by floods, capacity of the line for considerable periods has been reduced 20 to 40 per cent because of either insufficient amounts of oil or too few available tank cars.

Although current operating experience confirms predictions that the WEP lines can compete with tankers, various proposals are being discussed in several quarters for utilizing the 24-in. line after the war for transmitting natural gas from the Gulf Coast. However, none of these proposals are reported as being considered by WEP.

Initiative Key Factor

Apart from the tangible engineering accomplishments of the staff directed by Oscar Wolfe, chief engineer, which are widely appreciated in the industry, the achievement of building the 24-in. line from Texas to the East Coast within a year has materialized as the result of many measures coming under the heading of management initiative which are intangible. This has been evident from the beginning of the project.

On July 1, 1942, A. N. Horne arrived in Little Rock, Ark., with a brief case. This was the beginning of the War Emergency Pipelines, Inc., project. On July 3, he was joined by Burt E. Hull, with another brief case. Together, they laid out their papers on the floor of a room in the Marion Hotel, wrote specifications, employed a traffic manager, and talked to contractors about shipping points. A few days later, they bought office furniture at an auction with their own money. In fact, it was several weeks before funds for the job could be furnished by the Government. In the meantime they had to operate on a shoestring in order to start the WEP project.

Without waiting for the usual formalities, both general and stringing contractors went into the field and work was well under way early in August.

Work started several weeks earlier than it would have if the contractors had waited for contracts to be duly signed and approved. In doing this, they incurred serious responsibilities but they were ready to meet the demands of a national emergency.

Following the Phoenixville, Pa., dedication ceremony last week there has been special comment on the important part taken by Judge William P. Cole, Capt. A. N. Carter, U.S.N., J. R. Parten and Wayne Johnson in preparing the way for WEP 24-in. line in the year before it was started when attempts to build it were frequently rebuffed.

Bridgeport to Devote All Energies to Production

WICHITA, Kans.—The production end of the oil industry will receive undivided attention of the organization now known as Bridgeport Machine Co., effective August 1. Corporate name of the concern will be changed to Bridgeport Oil Co., Inc.

The company will discontinue the supply branch of its operations. Investments in this department, in the form of inventories, will be liquidated through jobber and other supply outlets, except such portions as may be currently useful to the continuing company in its oil-development operations.

F. W. Hollow, Wichita, is president of the company.

In converting its operations exclusively to the production end of the industry, Bridgeport directors last week declared a preferred dividend of $28 per share which will pay all accruals to July 1, 1943.

DEATHS

Charles E. Malley, 42, sales manager of the Springfield, Ohio, plant of Ohio Steel Foundry Co., died at his residence on July 11, following several months' illness. He had been with the company since 1924.

Tommie A. Eakins, first lieutenant in a U. S. Army bombardment squadron, was killed in action over Germany early this month. He is a former employe of Continental Supply Co., at Dallas, Tex., and was pipeline superintendent for Skelly Oil Co., at Stamps, Ark.

Arthur Stacey, 74, retired oil-well driller, was burned fatally at Laredo, Tex., while filling a gasoline tank on his farm last week.

James A. Mason, 62, for 30 years an employe of Gulf Oil Corp., died at his home in Tulsa. He had been critically ill for 3 weeks, and in ill health for a number of years. He had been employed in the Kiefer field for 17 years, and in the Seminole field for 10 years.

W. R. Lay, 80, Oil City, Pa., retired pipe-line official, died at Oil City, Pa. He had been associated with National Transit Co., Eureka Pipe Line Co. and Southwest Pipe Line Co. until 1914, when he joined the Southern Group, with whom he remained until his retirement in 1919.

Ferdinand H. Winkler, 47, secretary of the Pennsylvania Valley Crude Oil Association, died last week after being stricken while at work in the garden of his summer home on Cuba Lake, near Olean, N. Y. He was vice president and cashier of the Exchange National Bank, of Olean.

Paul Garrison, 58, employe of Sun Oil Co. for 31 years, died suddenly while at work in the Goose Creek field, Texas, last week. His home was in Houston, Tex.

Frank E. Schreffler, 63, oil and gas producer, died suddenly at his home in Clarion, Pa. Death was attributed to a heart attack. He had lived in Clarion for 35 years.

William L. Crawford, 49, oil operator of San Antonio, Tex., died last week while on a business trip in Corpus Christi.

William B. Puckett, 32, of Enid, Okla., an employe of Shell Oil Co., Inc., was accidentally killed last week in the Laurel Hill, Mississippi, community. A derrick which he was hoisting broke a high-tension wire, and the wire fell across the truck. He grasped a lever, completing the electrical circuit. He warned fellow workers not to touch the truck, then collapsed and died.

Sidney Ray Jones, 29, an employe of Humble Oil & Refining Co., at Pelly, Tex., died recently in a Galveston, Tex., hospital.

Carl F. Sawatske, 48, employe of National Transit Pump & Machine Co., died at his home in Oil City, Pa. Death was attributed to a heart attack.

John Frank Quinn, one of the discoverers of the Lyons-Quinn pool near Henryetta, Okla., died at his home in Haskell, Okla., after a brief illness. Mr. Quinn moved to Oklahoma in 1917, and was connected with Sinclair Oil & Gas Co. In later years he became an independent operator.

B. F. Stauffer, 63, died at his home in Tulsa on July 19. He had been bedfast for 2 years following a stroke of paralysis. Mr. Stauffer came to Tulsa more than 30 years ago, and had worked as a driller and superintendent for a number of companies until illness forced his retirement.

William W. (Billy) Rogers died suddenly at his home near Princeton, Ind., July 23, from what was believed to be a heart attack. He had been in the oil business for more than 20 years. He was originally with Ohio Oil Co., and later was associated with Consolidated Oil Development Co.

Proven Reserves Continue Decline With Important Discoveries in 3 Areas

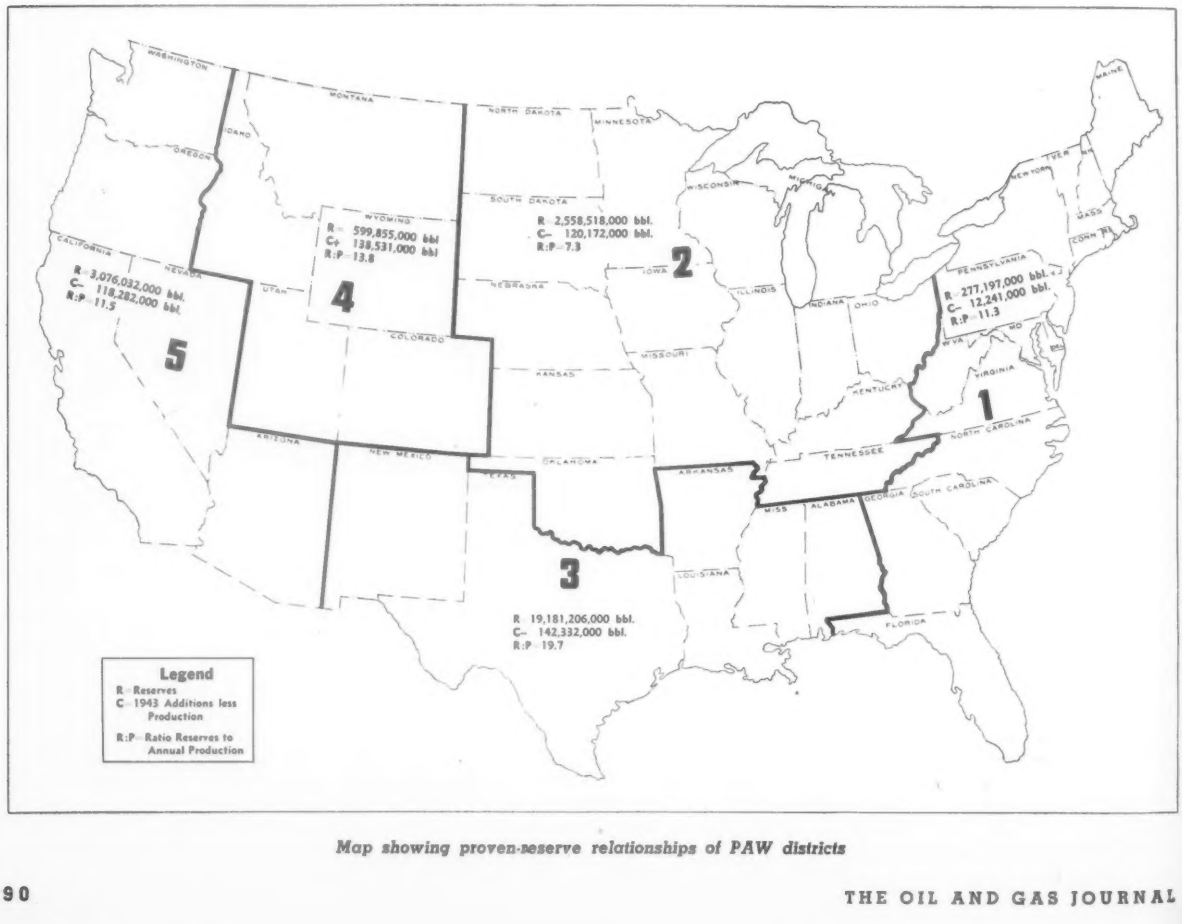
by W. V. Howard

Proven reserves as of July 1, 1943, stood at 20,404,092,000 bbl., a decline from the first of the year of 271,807,000 bbl. Of the 437,963,000 bbl. of new oil found so far this year 170,552,000 bbl. are credited to new fields. Three developments were recorded which have promise of growing into major fields, the discovery of oil at Katy, Texas, the Ellenburger lime discoveries in Winkler County, Texas, and the large extension of Tensleep production in Elk Basin, Wyoming.

RESERVES added by discoveries and extensions during the first half of 1943 are estimated to be 437,963,000 bbl., or 271,807,000 bbl. less than production during the same period. This record is better than that of the first half of 1942 by 70,093,000 bbl., and the chances are strong that further improvement will be shown by the end of the year as the big initial production recorded by the Ellenburger discoveries in Winkler County, Texas, is already spurring further exploration of the deep possibilities of the region.

Based on the experience of previous years, it may be anticipated that the total amount of oil credited to discoveries by the end of the year will amount to about 420,000,000 bbl., and these fields will eventually add another 720,000,000 bbl. as they are extended in later years. Thus it appears as though 1943 discoveries will fall about 300,000,000 bbl. short of production, an improvement of about 300,000,000 bbl. over last year's record, making the best performance since 1938.

In distribution, the record of 1943 to date is not as good as that of 1942. A year ago seven districts showed a net gain in reserves. These were the coastal district of California, Wyoming, Colorado, the lower Gulf Coast district of Texas, North Louisiana, Arkansas, and Ohio. This year only five districts show an increase of new oil over production: Wyoming, the



Map showing proven-reserve relationships of PAW districts

upper Gulf area of Texas, North Louisiana, Kentucky, and Ohio.

Eastern Fields

Considering the different sections of the country, District 1, including New York, Pennsylvania, and West Virginia, added no new oil, the only Pennsylvania Grade discovery being in Ohio. This discovery, in Muskingum County, has had three wells drilled with an average initial production of about 240 bbl., which is good for this area. In Ohio, as in eastern Kentucky and the Appalachian fields, main interest is now being directed toward the discovery of gas, and there is extensive drilling from Lake Erie to Tennessee. A fair measure of success has been obtained in Ohio, but not enough new supplies have been found to maintain adequate quantities.

The main play in the Illinois basin has passed into the West Kentucky sector where six new pools have been opened up since the discovery of the Smith Mills pool last fall. Most of the pools have pays in the Chester, although one produces from the Mansfield, of Pennsylvanian age, and one from the McClosky. In Indiana, wildcatting was generally unsuccessful, there being only two small pools opened, and Illinois fell far behind the record of recent years. Here the new pools are in the old producing area within the basin, no extensions in any direction having been made.

In Michigan new fields continue to be found in the northern sector, but the most interesting developments were the opening of Newaygo County to both oil and gas production. This county, lying between the old Muskegon and Mount Pleasant districts, has been prospected for years without success.

The Forest City basin had a brief flurry of excitement when oil was found in the Bartlesville in an Atchison County, Missouri, wildcat. The well was not completed as a commercial producer. In Kansas, chief interest was furnished by the Carmi pool in Pratt County, where oil was discovered last fall although the discovery well was not completed until February of this year. This pool is well down on the flanks of the Central Kansas uplift, and a line drawn between it and the Cunningham field lies about parallel to the axis of the arch. This suggests that a new trend may be developed and wildcatting is active along the trend.

On the other side of the regional high in Saline County two discoveries were made, one in the Mississippi lime which produces in the nearby McPherson County fields and the other in the Viola lime. For many years operators have believed that production would be found in the Salina basin off the flanks of the Central Kansas and Nemaha arches and these discoveries may touch off a play extending into southern Nebraska.

Oklahoma

Oklahoma's most interesting discovery was West Edmond. This field produces from the Hunton and appears to be in a stratigraphic trap west of the main Nemaha ridge fields. It is possible that additional drilling will be done west of the other producing fields where cross folds intersect the Nemaha ridge. This discov-

PROVEN OIL RESERVES ON JULY 1, 1943

(In thousands of barrels)

	Estimated reserves as of Jan. 1, 1943	1943 Discoveries	1943 Extensions	Total	Less 1943 prod.	Estimated reserve as of July 1, 1943	Gain or loss (—)	Ratio reserves to production: Jan. 1, 1943	Ratio reserves to production: July 1, 1943	Per cent July 1, 1943
California	3,194,314	8,010	13,550	3,215,874	139,842	3,076,032	—118,282	12.8	11.5	15.1
Southern	1,094,009	.....	50	1,094,059	55,222	1,038,837	—55,172	10.0	9.4	5.7
Coastal	376,614	.....	3,200	379,814	19,569	360,245	—16,369	11.1	9.2	1.8
Northern	1,723,691	8,010	10,300	1,742,001	65,051	1,676,950	—46,741	16.4	12.4	8.2
Montana	91,663	52	1,111	92,826	3,744	89,082	—2,581	11.4	11.9	0.4
Wyoming	333,393	26,280	132,000	491,673	16,628	475,045	141,652	10.2	14.3	2.3
Colorado, Utah	31,286	600	.....	31,886	1,158	30,728	—558	13.5	13.3	0.2
New Mexico	649,637	300	250	650,287	18,283	632,004	—17,633	19.7	17.3	3.1
Texas	11,756,828	99,080	47,800	11,903,708	257,794	11,645,914	—110,914	24.8	22.6	57.1
Panhandle	633,355	.....	.....	633,355	16,304	617,051	—16,304	20.4	18.9	3.0
West	2,990,223	3,440	20,000	3,013,663	39,654	2,974,009	—16,214	37.1	37.5	14.6
North	671,676	4,000	.....	675,676	20,262	655,414	—16,262	16.5	16.2	3.2
West Central	103,027	1,720	.....	104,747	4,350	100,397	—2,630	11.9	11.5	0.5
East	3,454,469	12,480	12,800	3,479,749	80,083	3,399,666	—54,803	23.3	21.2	16.7
South	250,658	400	.....	251,058	11,002	240,056	—10,602	12.6	10.9	1.2
South Central	53,755	40	.....	53,795	3,138	50,657	—3,098	10.0	8.1	0.2
Lower Gulf	839,572	2,000	.....	841,572	21,201	820,371	—19,201	23.8	19.3	4.0
Upper Gulf	2,760,093	75,000	15,000	2,850,093	61,800	2,788,293	28,200	27.3	22.6	13.7
Louisiana	1,186,295	7,040	40,000	1,233,335	61,260	1,172,075	—14,220	9.2	9.6	5.7
Gulf	886,239	2,840	5,000	894,079	45,369	848,710	—37,529	9.3	9.4	4.1
North	300,056	4,200	35,000	339,256	15,891	323,365	23,309	9.2	10.2	1.6
Arkansas	415,061	1,200	4,800	421,061	13,213	407,848	—7,213	15.6	15.4	2.0
Mississippi	59,734	120	.....	59,854	10,105	49,749	—9,985	2.2	2.5	0.2
Oklahoma	1,121,226	1,000	.....	1,122,226	60,965	1,061,261	—59,965	8.2	8.7	5.2
Kansas	896,819	7,750	24,000	928,569	54,479	874,090	—22,729	9.3	8.0	4.3
Nebraska, Missouri	2,755	.....	.....	2,755	466	2,289	—466	2.0	2.5	0.0
Illinois	469,789	6,000	1,500	477,289	41,538	435,751	—34,038	4.2	5.2	2.1
Indiana	32,639	120	.....	32,759	2,711	30,048	—2,591	3.7	5.5	0.2
Kentucky, Tennessee	42,313	6,000	.....	48,313	3,257	45,056	2,743	9.1	6.9	0.2
Michigan	77,861	5,000	2,400	85,261	10,526	74,735	—3,126	3.6	3.6	0.4
Ohio	34,848	2,000	.....	36,848	1,560	35,288	440	10.3	11.3	0.2
West Virginia	31,128	.....	.....	31,128	1,372	29,756	—1,372	8.9	10.8	0.1
Pennsylvania	198,273	.....	.....	198,273	8,588	189,685	—8,588	11.8	11.0	0.9
New York	50,037	.....	.....	50,037	2,281	47,756	—2,281	10.1	10.5	0.2
Total United States	20,675,899	170,552	267,411	21,113,862	709,770	20,404,092	—271,807	14.9	14.4	...

ery also opens up the possibility of Mississippi lime production still farther west. Outside of this discovery, there was nothing found in Oklahoma other than small fields in old producing areas except a granite wash well in Washita County.

Mississippi

Although the discovery well is not yet completed, the chances are that Mississippi will have the best record of the three states near the mouth of the Mississippi River before the end of the year. The potential discovery well is in the eastern part of the state and reports a penetration of over 100 ft. of saturated Tuscaloosa sand. This sand, which is correlated with the Woodbine, has yielded oil in Mississippi at Tinsley and also in a recent discovery near Natchez, but results have hitherto been disappointing. This latest discovery may prove to be the starter for an extensive play continuing into Alabama.

The Wilcox play in eastern Louisiana appears to be dying down, although a discovery was made this year in Concordia Parish. The deep-sand play along the Arkansas-Louisiana line also does not appear to afford much promise in the future and North Louisiana and Arkansas report only four oil and two gas discoveries out of a total of 76 wildcats.

The most important discovery on the Texas Gulf Coast was that of oil in the Katy field. Just what this discovery means in terms of barrels of oil will not be determined for some time, possibly several years. The perimeter of the gas-distillate area in this field is 45 miles. Oil may form a belt extending completely around the field or it may exist only in pockets. The possibilities, therefore, range from a few hundred thousand barrels to hundreds of millions. Katy is one of a number of gas-distillate fields on whose flanks oil has been found and the widespread distribution of these fields leads to the possibility that all gas-distillate fields may turn out to be wet gas caps to extensive oil accumulations. Elsewhere in the coastal areas, developments followed normal lines, a few small discoveries with some larger ones in prospect, but little of major import.

Back from the coast, search for a major oil accumulation in the Wilcox trend continues with the result that a large structure was opened up at that depth in the old Slick pool of Goliad County, one of the Pettus sand fields which did not pay off. The field fills in a part of the gap between South Caesar and the Wilcox trend fields to the northeast and promises to be of major importance.

East Texas

East Texas continues active with most attention centered on the Lower Cretaceous group of pays which, to date, form the lowest producing horizons in the district. Added to Quitman, Kildare and Coke, found last year, are the Manziel, New Hope and Scroggins finds of this year. These discoveries make the East Texas basin one of the country's most highly concentrated development areas.

North and West Central Texas rocked along with a steady continuation of the Caddo and Mississippi lime discoveries of recent years. The discovery rate in this area is high and there are, apparently, many fields yet to be found but the size of the average discovery is small.

The second area in which discoveries were made in the first half year which may eventually lead to fields of the several hundred-million-barrel category is West Texas. Here three good wells were brought in in the Ellenburger in Winkler County, greatly extending the possibilities of production from this pay and undoubtedly greatly prolonging the productive life of this section of West Texas. The wells are deep and expensive so that development may be slow but the results of this year's Ellenburger drilling tend to confirm the views of those who have held that the Ordovician of West Texas would eventually prove as important a pay zone as the Permian. Developments in the New Mexico sector of the Permian basin were far overshadowed by the Ellenburger discoveries but these definitely brought New Mexico into the area for Ellenburger prospecting.

Wyoming

A third major development is now under way in Wyoming where the rapid expansion of Embar-Tensleep production in Oregon Basin last year was followed by drilling in Elk Basin which has opened up an area of some 6 square miles of virtually proven production. Other known structures are being drilled to these deeper pays and possibilities for major production appear excellent. The Sundance also proved to be an important producer in western Wyoming in the Steamboat Butte discovery well. Exploration in Montana was largely centered around attempts to extend the Cut Bank shoreline pay to the south.

California continued to lose reserves as discoveries were limited to two oil fields and four gas fields. Of the oil fields, Pleasant Valley is an Eocene field in the Coalinga district and may prove of major importance.

Although not of direct importance to the United States, the great development of the Fort Norman area in northern Canada may help relieve the demand for American crude in Alaska and the Far North. It is believed, however, that transportation costs will prevent this oil from becoming an important factor in the larger Canadian markets.

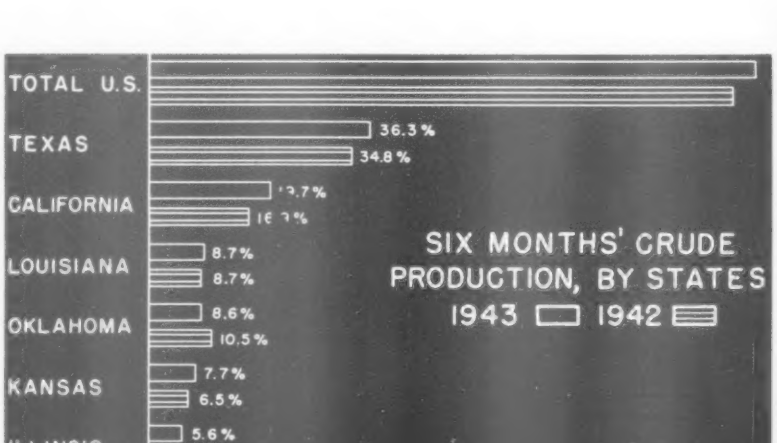


Chart showing the relationship of production from the most important oil-producing states. Important increases have taken place in Texas and California. Louisiana, whose rate of production has kept pace with the national increase, has moved into third place displacing Oklahoma, which has had a sharp decline in production. Kansas, with a large increase, has moved from sixth to fifth place, replacing Illinois

Crude-Oil Production Responds to Rising War Requirements by Setting New Peak

by W. V. Howard

PRODUCTION of crude oil in the United States during the first half of 1943 reached the record level of 709,770,000 bbl., an increase of 31,232,000 bbl. over the corresponding period of 1942. Noteworthy increases were recorded by three states, Texas, California and Kansas, totaling 57,909,000 bbl. or 26,677,000 bbl. more than the national increase.

After many years in third place, Oklahoma's production fell below that of Louisiana and, if its decline is not arrested, the end of the year may see Oklahoma passed by Kansas. Illinois, which a year ago stood in fifth place has dropped to sixth. Another state to lose ground is Mississippi, whose production has dropped by one-third during the past year.

In these three states, the decline can be considered due to natural causes and not to production control as they are favorably located with respect to markets and are little affected by proration.

The influence of war markets and transportation is plainly visible in Texas where the coastal district, East Texas and the Panhandle increased their production. The decline in South Central, North and West Central Texas can be attributed to natural causes but that of West Texas was entirely artificial. West Texas is one of the few areas remaining in the United States in which production could be sharply raised at the present time. The following table shows Texas production by districts:

TEXAS PRODUCTION

	1943	1942	Diff.
East	80,083	72,688	7,395
Gulf	61,800	48,351	13,449
Lower Gulf	21,201	18,118	3,083
South	11,002	9,736	266
South Central	3,138	3,166	—28
North	20,262	20,458	—196
West Central	4,350	4,524	—174
West	39,654	42,528	—2,974
Panhandle	16,304	15,493	811
Total	257,794	235,062	22,732

Of the different oil-producing states, Texas, California and Kansas seem almost certain to establish new peaks while Arkansas, Colorado and Wyoming appear likely to reach new highs. As is shown in the article beginning on the next page, these peaks are mainly due to considerable increases in production from the major fields and not from a state-wide general increase or from newly discovered fields. By drawing heavily on the backlog established by the large fields, conditions are established which may result in a rapid decline from present peaks in most states.

This, therefore, is one year in which a new production peak is not a sign of steady growth which may be projected into the future. Indications are that many areas are being overproduced in order to meet current demands and there is considerable doubt whether they can continue to be met much longer from domestic sources. A shortage of oil in 1944 has been predicted by many observers and there is little in the present record to furnish evidence that these pessimistic predictions are not justified.

PRODUCTION IN UNITED STATES 1937-42 AND FIRST HALF YEAR 1942-43

(In thousands of barrels)

	1937	1938	1939	1940	1941	1942	—1st 6 mos.— 1942	1943	Difference	Producing wells 7-1-43	Dly. av. bbl. per well	Cumulative prod.
Arkansas	12,181	18,357	21,383	26,072	26,301	26,566	13,190	13,213	23	3,080	23.7	543,474
California	238,592	249,930	225,493	223,104	230,317	248,395	114,455	139,842	25,387	19,058	40.4	6,193,860
Colorado	1,578	1,324	1,415	1,412	1,734	2,309	1,112	1,156	44	201	31.7	44,466
Illinois	7,426	22,800	92,203	146,484	128,550	106,282	57,200	41,538	—15,662	29,952	7.7	971,617
Indiana	821	968	1,711	4,978	6,536	6,620	3,541	2,711	—830	1,970	7.6	146,952
Kansas	69,158	58,315	60,973	64,832	81,899	96,879	44,989	54,479	9,490	22,615	13.3	1,228,580
Kentucky	5,497	5,834	5,621	5,188	4,811	4,607	2,394	3,242	848	14,750	1.2	188,975
Louisiana	90,427	94,955	94,182	103,410	117,634	128,231	59,021	61,260	2,239	5,839	58.0	1,362,818
Michigan	16,411	19,139	23,563	19,733	16,325	21,537	10,275	10,526	251	3,297	17.6	192,749
Mississippi	....	....	107	4,400	16,324	27,545	15,368	10,105	—5,263	378	147.7	57,761
Montana	5,799	4,825	5,853	6,583	7,344	8,045	3,963	3,744	—219	2,150	9.6	101,031
Nebraska	.....	....	2	276	1,713	1,353	737	456	—281	85	29.6	3,796
New Mexico	38,438	36,009	37,872	39,488	39,566	32,999	15,408	18,283	2,875	3,779	26.7	363,156
New York	5,465	5,045	5,098	4,999	5,126	4,968	2,368	2,281	—87	20,900	0.6	141,847
Ohio	3,550	3,297	3,156	3,159	3,284	3,384	1,520	1,560	40	24,850	0.3	593,710
Oklahoma	223,107	169,307	152,400	149,629	153,167	136,761	70,821	60,965	—9,856	52,582	6.4	5,145,931
Pennsylvania	19,174	17,449	17,832	17,353	16,492	16,841	8,903	8,588	—315	82,000	0.6	1,038,989
Texas	502,967	470,760	482,335	489,183	501,348	474,935	235,062	257,794	22,732	97,644	14.6	7,893,794
West Virginia	3,829	3,725	3,580	3,444	3,378	3,492	1,707	1,372	—335	17,725	0.4	421,777
Wyoming	19,637	18,956	21,207	26,232	30,009	32,736	16,475	16,628	153	3,709	24.8	587,815
Miscellaneous	60	60	94	71	62	57	29	27	—2	110	1.4	1,248
Total	1,264,117	1,200,875	1,254,630	1,340,030	1,391,920	1,384,542	678,538	709,770	31,232	406,674	9.6	27,274,348
Daily average	3,463	3,290	3,428	3,671	3,813	3,793	3,749	3,921	172	.....	.....	.....

Major Fields Called Upon to Supply Disproportionate Share of Nation's Oil

by W. V. Howard

THE nation's dependence on its major oil fields is plainly shown by the fact that the 75 largest oil fields increased their production by 34,539,000 bbl. while the total production for the United States is only 31,232,000 bbl. above that of the first half of 1942. Thus, as the largest fields were called on to produce about 9½ per cent more oil than they did last year, the remaining fields suffered a net decline in production of 3,307,000 bbl. Even this fact, however, does not tell the whole story. Of the 75 major fields, 23 showed a decline in production, amounting to 25,503,000 bbl., or from 135,945,000 bbl. to 110,442,000 bbl. The remaining 52 fields, thus increased their production from 225,729,000 bbl. to 285,751,000 bbl. or nearly 27 per cent. Expressed differently, 52 of the country's largest fields were called upon to supply the whole of the increased production together with 28,810,000 additional barrels to make up for the declining production of the remaining fields. The question as to how long this can continue is pertinent.

The fields which, last year, were the 75 largest produced 55.1 per cent of the nation's oil while this year's largest fields produced 53.3 per cent. This indicates that there was a considerable change in the roster of major fields. After allowing for certain combinations of fields which caused a change from the list published in last year's Semiannual Number, 15 new fields replaced an equal number of last year's leaders. The changes are as follows:

Added to this year's list:

Haynesville, La.-Ark.
Webster, Tex.
Magnet-Withers, Tex.
Burnett and South, Kans.
Oregon Basin, Wyo.
Kraft-Prusa, Kans.
Greeley, Calif.
Geneseo-Edwards, Kans.
Van, Tex.
Old Ocean, Tex.
Vacuum, N. M.
Coyote, West, Calif.
Lafitte, La.
Brea-Olinda, Calif.
Paradis, La.

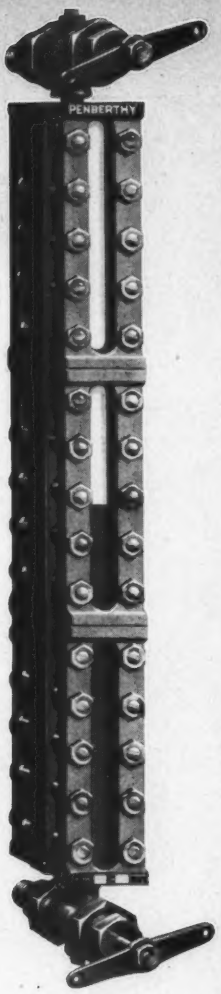
(Continued on Next Page)

PRODUCTION OF 75 MAJOR FIELDS

(In thousands of barrels)

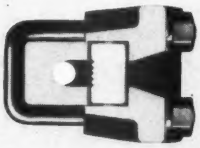
	Jan. 1, 1943 Age in years	1943 Production, first 6 months	1942 Production, first 6 months	Difference
East Texas	14	60,818	57,641	3,177
Wilmington, California	8	17,068	16,181	887
Coalinga district, California	43	15,184	8,045	7,139
Oklahoma City, Oklahoma	14	10,698	13,985	—3,287
Midway-Sunset, California	43	10,093	9,981	112
Tinsley, Mississippi	3	9,651	15,198	—5,547
Bradford-Allegany, Pa.-N.Y.	73	9,002	9,479	—477
Conroe, Texas	12	8,605	5,928	2,677
Kettleman, California	15	7,731	5,756	1,975
Ventura Avenue, California	28	7,565	6,200	1,365
Eunice-Monument, New Mexico	14	7,509	6,166	1,343
Gray County, Texas	17	7,499	6,644	855
Hastings, Texas	9	7,306	4,170	3,236
Louden, Illinois	5	7,228	9,629	—2,401
Huntington Beach, California	23	6,225	5,290	935
Hawkins, Texas	2	6,161	2,190	3,971
Long Beach, California	22	5,918	6,668	—750
Hutchinson County, Texas	20	5,747	5,799	—52
Trapp, Kansas	14	5,651	4,511	1,140
K.M.A., Texas	13	5,448	5,421	37
Salem, Ill.	5	5,329	8,316	—2,987
Tom O'Connor, Texas	9	5,314	2,675	2,639
Silica-Raymond, Kansas	12	5,166	3,993	1,273
Dominguez, California	20	4,696	3,476	1,220
Talco, Texas	7	4,639	4,842	203
Wasson, Texas	7	4,614	5,296	682
Griffin-Keensburg-New Hamony, Indiana-Illinois	4	5,596	6,890	—2,294
Reed City, Michigan	2	4,452	4,069	383
Slaughter, Texas	7	4,128	3,698	430
Hendrick-Keystone, Texas	17	4,101	4,338	—237
Yates, Texas	17	4,076	3,319	757
Santa Maria Valley, California	9	4,013	2,517	1,494
Mount Poso, California	20	4,008	3,463	545
Thompson, Texas	12	3,908	2,278	1,630
Lance Creek, Wyoming	35	3,769	4,035	—266
Santa Fe Springs, California	24	3,717	3,801	—84
Goldsmith-Harper, Texas	9	3,696	3,869	—173
Zenith-Peace Creek, Kansas	5	3,682	2,042	1,640
Bemis-Walters, Kansas	18	3,557	2,676	881
Ten Section, California	6	3,520	2,254	1,266
Inglewood, California	19	3,455	3,209	446
Kern River, California	44	3,434	2,761	673
Rodessa, Texas-Louisiana-Arkansas	12	3,209	4,054	—845
Magnolia, Arkansas	4	3,181	3,263	—82
Anahuac, Texas	8	3,005	2,270	735
Haynesville, Louisiana-Arkansas	22	2,983	1,086	1,897
Coles Levee-Tupman, California	4	2,972	2,338	634
West Ranch, Texas	5	2,968	2,445	523
Burbank and South, Oklahoma	23	2,925	2,854	71
Webster, Texas	6	2,894	1,671	1,223
Magnet-Withers and North, Texas	6	2,841	1,708	1,133
Burnett and South, Kansas	5	2,728	1,606	1,122
Shuler, Arkansas	5	2,686	2,987	—301
Rio Bravo, California	5	2,661	2,025	636
Cut Bank, Montana	10	2,620	2,764	—144
McElroy, Texas	17	2,523	2,305	218
Elk Hills, California	24	2,498	1,921	577
Oregon Basin, Wyoming	15	2,392	1,879	413
Ville Platte, Louisiana	5	2,379	3,616	—1,237
Salt Creek, Wyoming	35	2,377	2,498	—121
Howard-Glasscock, Texas	16	2,374	2,401	—27
Carson County, Texas	21	2,290	2,300	—10
Kraft-Prusa, Kansas	5	2,287	1,088	1,199
Greeley, California	8	2,274	1,307	967
Cowden-Foster, Texas	13	2,271	4,452	—2,181
Smackover, Arkansas	20	2,263	2,462	—199
Geneseo-Edwards, Kansas	8	2,257	1,593	663
Van, Texas	14	2,232	1,584	648
Old Ocean, Texas	8	2,230	1,818	512
Vacuum, New Mexico	14	2,218	1,588	630
Coyote, West, California	34	2,215	1,679	536
LaFitte, Louisiana	7	2,210	1,912	298
Brea-Olinda, California	54	2,135	1,593	542
St. Louis, Oklahoma	16	2,087	3,003	—916
Paradis, Louisiana	3	2,051	944	1,107
Total 75 largest fields	..	396,213	361,674	34,539
Per cent of United States	..	55.8	53.3	....
75 largest fields	..	.....	373,854	....
First half 1942	..	.....	55.1	....

QUALITY UNCOMPROMISED



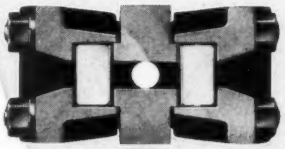
PENBERTHY
Reflex
DROP FORGED STEEL LIQUID LEVEL GAGES

Liquid shows black—empty space shows white. Preferred wherever liquid level must be easily and positively visible . . . and when liquids are under high pressure or at high temperature.

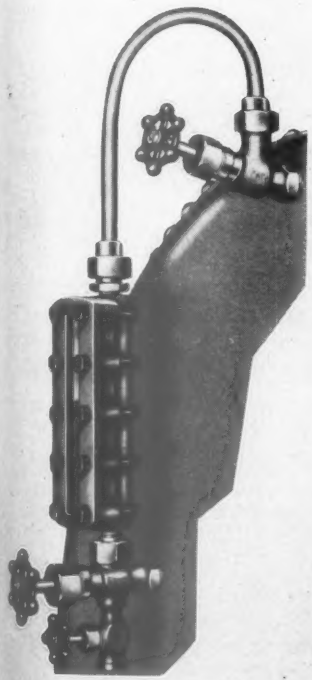


PENBERTHY
Transparent
DROP FORGED STEEL LIQUID LEVEL GAGES

Used to observe color and density of liquids under high pressures, and/or temperatures. Construction is exceptionally rugged . . . similar to Reflex types.



Penberthy Liquid Level Gages



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Water shows black—steam shows white. U-bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler.

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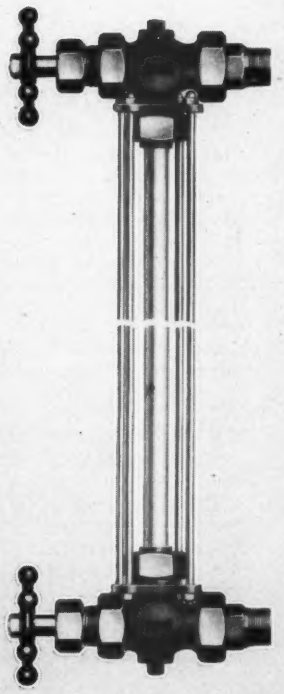
DROP FORGED STEEL LIQUID LEVEL GAGES

Made of Chromium-molybdenum alloy temperature-resisting steel, extra heavy throughout. Stainless steel trimmed. Tubular glass type gages also available in various other metals suitable for practically all conditions.



PENBERTHY INJECTOR CO.

DETROIT, MICHIGAN • Canadian Plant: Windsor, Ontario

PENBERTHY PRODUCTS

TREND OF MAJOR FIELDS

Daily average production:	1943 No.	1943 6 mos. prod.*	1943 Per cent	1942 No.	1942 6 mos. prod.*	1942 Per cent	1941 No.	1941 6 mos. prod.*	1941 Per cent
Over 80,000 bbl.	3	93,088	13.1	3	89,020	13.1	4	113,781	17.2
60,000 to 79,999	..	.....	....	1	13,985	2.1	1	11,880	1.8
40,000 to 59,999	10	85,659	12.1	5	45,450	6.7	4	31,037	4.7
30,000 to 39,999	7	42,378	6.0	8	50,051	7.4	7	42,957	6.5
25,000 to 29,999	7	34,345	4.8	4	20,849	3.1	7	33,947	5.1
20,000 to 24,999	11	43,550	6.1	12	48,848	7.2	5	20,355	3.1
15,000 to 19,999	14	43,602	6.1	12	38,214	5.6	10	32,025	4.8
10,000 to 14,999	32	69,163	9.6	34	74,846	11.0	35	76,106	11.5
Total	84	411,785	57.8	79	381,263	56.2	73	362,082	54.7
Total United States	..	709,770	100.0	..	678,538	100.0	..	661,443	100.0

*In thousands of barrels.

Dropped from last year's list:

Benton, Ill.
Johnsonville, Ill.
Dale-Hoodville, Ill.
Cotton Valley, La.
Rural Hill, Ill.
Jennings, La.
Olla, La.
Clay City, Ill.
Ventura-Newhall, Calif.
Golden Meadow, La.
Cement, Okla.
Cayuga, Tex.
Hall-Gurney, Kans.
Earlsboro, Okla.
Woodlawn, Ill.

Illinois and Oklahoma, having dropped respectively six and two fields from the select list, have now three of the largest fields each. Of these six fields, only Burbank showed an increase during the first half of 1943 over the corresponding period last year.

List of Fields Growing

Originally, the list of major fields was restricted to 75 because that was the approximate number which, over a period of years, produced more than 10,000 bbl. daily. If the 10,000-bbl. mark is considered as limiting the major fields there were actually 84 this year compared with 79 a year ago and 73 in the first half of 1941. This does not mean that major fields are being discovered, however. In 1942 four fields rose from zero or very small production into major rank in a year, this year there are no such fields. Hawkins, Kraft-Prusa and Paradis, all comparatively new fields have doubled their production in a year. Haynesville, an oldster of 22 years, has also more than doubled its production because of the newly discovered Pettit pay. Other fields showing important increases are the Coalinga area, which has been producing for 43 years, Tom O'Connor (9 years old), Thompson (12 years old), Zenith-Peace Creek (5 years old), Ten Section (6 years old), Webster (6 years old), and Burnett (5 years old).

The fields producing 10,000 bbl. or better now produce 57.8 per cent of the country's oil and their distribution provides additional food for thought. If the United States is divided into major producing areas on the basis of a comparison between this year's production record and that of the first half of 1942, four areas show a considerable increase. These are California, coastal Texas, East Texas and Kansas, with about 51 per cent of the total production. The total increased production in these four areas was 60,203,000 bbl., of which the large fields were responsible for 51,736,000 bbl. or about 85 per cent.

In the areas of nearly constant production, namely Texas, other than the coastal and East Texas areas, Louisiana-Arkansas, Michigan and the eastern states, and the Rocky Mountain states, the area as a whole showed a gain of 2,911,000 bbl. while the large fields lost 2,874,000 bbl. of production. Conditions are somewhat complicated in this group of fields since the Permian basin and the Rocky Mountain area are not producing to capacity. Both of these districts are expected to show a considerable increase in production and at least West Texas can do so because of the major fields which have been under restriction during the past year. The other areas have not these large reserves to call on and may start declining in the near future.

In the areas of declining production, Oklahoma, Illinois-Indiana and Mississippi, the major fields have on the whole dropped proportionally with the total decline.

This table, therefore, shows that those fields which are now major fields are the ones which must furnish any additional increase in production from those areas from which an increase will be demanded. They have already borne the brunt of the burden in those areas in which production has increased and opinion is general that, on the whole, they cannot be called on for more production at this time. The areas in which production is declining have seen more than half of their major fields of this year drop into the class of minor fields and those which are still major fields have lost about one-third of their production in a year.

Most Areas Declining

The areas in which major fields are being developed or have been developed which can take up some of the burden of greatly increasing production are in the Permian basin and in Wyoming. Remoteness from transportation centers, added to the quality of the oil in these fields will throw additional problems on the industry. In other parts of the country, there does not appear to be much chance of developing enough large fields from the prospects now known even to hold production steady at present high levels.

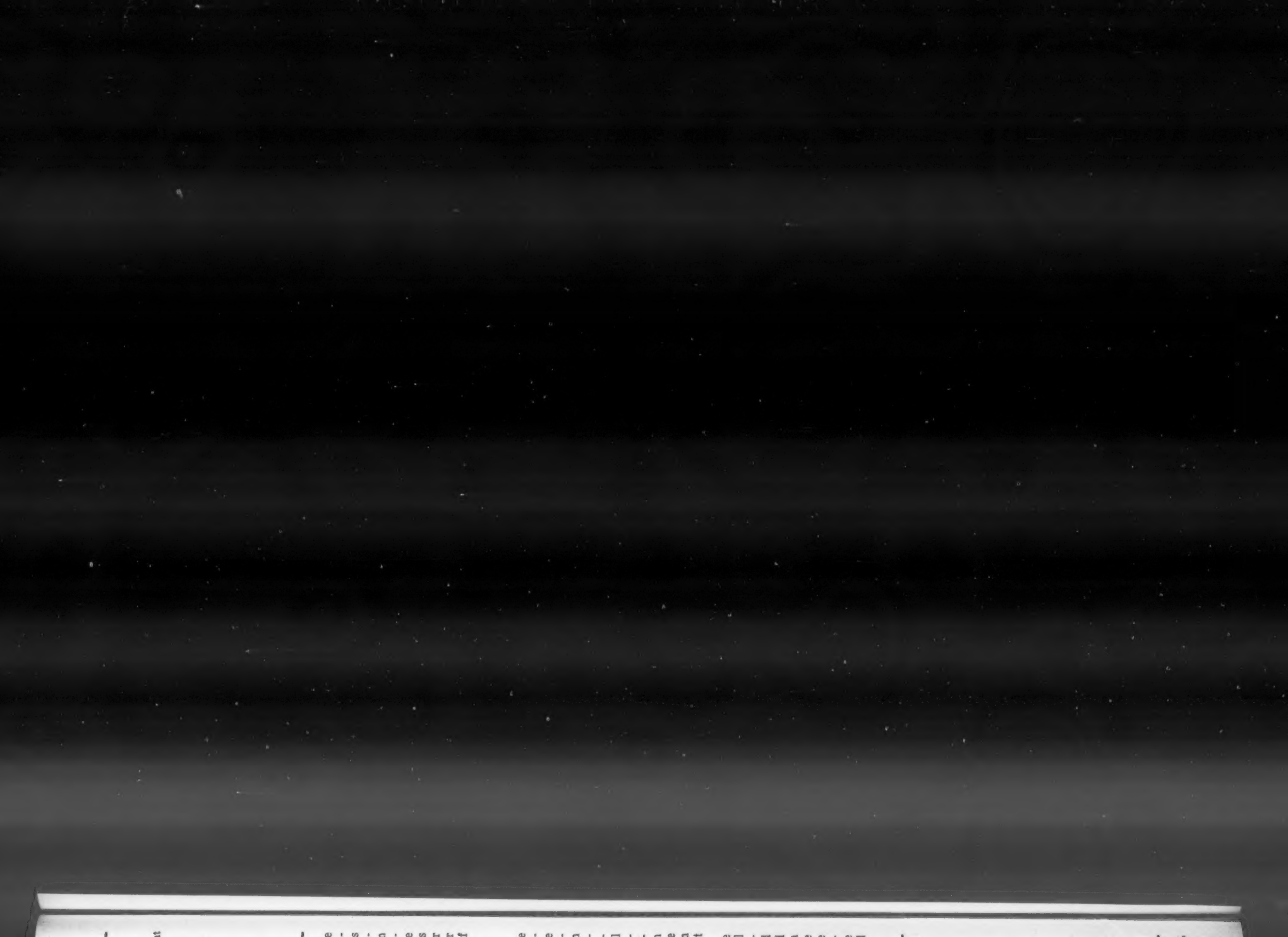
The large fields, constituting the nation's main reserve of available oil have responded to an increased demand. There is a relatively small group which has not yet been called on. These constitute the last known major reserve and, except in the areas in which these fields exist, the production trend appears to be inevitably downward unless more 10,000-bbl. fields can be found and developed within the next year.

SIX MONTHS' PRODUCTION RECORD

(In thousands of barrels)

	Total 1943	Total 1942	Total Change	Major fields 1943	Major fields 1942	Major fields Change	% in major fields
Areas of increased production:							
California	139,842	114,455	25,387	115,509	94,213	21,296	82.5
Coastal Texas	94,003	76,205	17,798	40,923	26,233	14,690	43.5
*East Texas	78,825	71,016	7,809	73,850	66,257	7,593	93.6
Kansas-Nebraska	54,935	45,726	9,209	29,223	21,066	8,157	53.2
Areas of steady production:							
C., N. and W. Tex.-N. Mexico	101,951	101,577	374	58,494	58,710	—216	57.4
*Louisiana-Arkansas	75,731	73,883	1,848	24,717	27,263	—2,546	32.6
Michigan and East	27,885	27,226	659	13,454	13,548	—94	48.2
Rocky Mountain	21,552	21,522	30	11,158	11,176	—18	51.8
Areas of declining production:							
Oklahoma	60,692	70,821	—10,129	15,710	19,855	—4,135	25.9
Illinois-Indiana	44,249	60,741	—16,492	19,096	27,684	—8,588	43.2
Mississippi	10,105	15,368	—5,263	9,651	15,196	—5,547	95.5
Total	709,770	678,538	31,232	411,785	381,193	30,592	57.8

*Rodessa, Tex., in Louisiana-Arkansas.



PAW REPORTS TO THE INDUSTRY

by Ralph K. Davies*

THE war news of the last few weeks should, it seems to me, offer all of the clues that any of us need as to what lies ahead for the oil industry for as long as hostilities continue. The fall of the Axis in Tunisia, the recapture of Attu, the invasion of Sicily, the assaults upon the Japanese in the New Georgia sector, and the great naval victories in that area — all of these things have demonstrated unmistakably that our days of defensive warfare are definitely over; that we are now entered upon the offensive stage, not on one, but on many fronts. Certainly it is not necessary to tell any oil man that this is going to mean a demand for petroleum products on a level far surpassing even the enormous demands that already have been made.

It is a challenge more formidable than any that we have ever been called upon to face: one that is going to tax all of that faculty for accomplishment which has made the American oil industry the greatest on earth. But, formidable though it may be, you of the industry know, and we in the Petroleum Administration know, that it will be met—successfully.

The job ahead of all of us may be likened somewhat to a hurdle race, for we not only have hurdles to clear —and high hurdles, at that—but we have to clear them against time.

Three of those hurdles are frequently spoken of as a group, known in vernacular as "the three M's"—manpower, materials and money.

As for the first—manpower—I assume that all of us are reasonably resigned to the conviction that it will become increasingly troublesome. Most oil men are familiar with the efforts which have been made by the Petroleum Administration working with the industry, to bring about the recognition of many categories of employes as essential workers. I would be less than fair if I did not say that the Selective Service people in Washington have consistently shown an intelligent and sympathetic understanding of our problem; but, at the same time, I would be less than realistic if I did not point out, also, that Selective Service has its job to do. Its job is to furnish men in the numbers called for by the armed services, and we have no choice but to recognize that large numbers of those men will come from the oil industry. All that we can do is to work with Selective Service on a program of making the withdrawals according to orderly plan, and of permitting, as far as possible, the training of replacements.

As for the second "M"—materials—I think that we may find some solace in the apparent indications that the situation probably will not become worse, and there are some signs that it may gradually become much better.

The third "M" — money — remains an unsettled question. Our recommendation for an average increase of 35 cents per barrel in the price of crude oil, and for equivalent adjustments in the prices of products, was made after the most painstaking analysis. We now have pending, as I believe everyone knows, an appeal to Price Administrator Prentiss Brown for reconsideration of his rejection of this recommendation.

In making our recommendation in the first place, we were prompted, perhaps more than for any other reason, by our very great concern over the decline in crude production, and

RALPH K. DAVIES

The next ten editorial pages of this issue are devoted to exclusive reports to the Journal from directors of various divisions of the Petroleum Administration for War. The authors report on current progress of their respective programs and many touch on important new developments.

*Deputy petroleum administrator for war.

by the discouraging record of new discoveries for the last 4 years. Certainly there is nothing on the horizon to lessen that concern. On the contrary, all of the available evidence points to the likelihood that, unless some sizable new discoveries are made, and unless secondary recovery is stepped up, and unless there can be greater development of good, known reserves, the continuation of the war for a very extended period will almost certainly find us critically short of crude oil. Even now, as a matter of fact, you will hear more than one oil man pleading that means be found for utilizing foreign oil fields to a greater extent than they are now being utilized, as a means of guarding against excessive production from American fields.

Of course, against these qualities there must be offset the fact that the industry, like all others, is no longer able to operate with the same freedom as it could in peacetime. It is subject to wartime controls imposed by Government. But, I believe that every reasonable oil man will concede that, even in this respect, the industry is more fortunate than any other. No other industry has its activities regulated by an agency which has been staffed almost entirely with men who have been enlisted directly from its own ranks. No other industry has the cooperative arrangement with Government which the men of oil have through the PIWC and the various district committees.

No Pretense to Perfection

We will readily admit that all oil men have not always applauded everything that we have done, but this is not surprising, for one seldom expects to find oil men unanimous on anything. Moreover, we make no pretense to perfection. On the whole, however, the comments that have reached me indicate that both within and without the industry it is conceded that the Petroleum Administration has done an intelligent, effective job; that it has been reasonable, fair and impartial. I say this, even though I am aware that there have been times when we have had to adopt policies or taken actions which were bound to cause inconveniences, or hardship, or even monetary loss to the industry. In consequence, some of you have asked: "Why should oil men do this to other oil men?" The answer, of course, is that, while we are oil men, we are enlisted for the duration as public servants, sworn to uphold the public interest. This we must and will continue to do. If any individual, or company, or group of individuals or companies, suffer as the result, we are sorry, but we have no choice.

By way of counterbalancing the many unpleasant things which war has meant to the oil industry, I know that all oil men find pride in knowing that they have been the ones who have fueled and lubricated the victories which our fighting forces have been winning on four continents; and that they are the ones who will fuel and lubricate the victories, from here on, that must lead to "V-day."

I am certain, too, that all oil men know that the better and the faster they do their jobs, the sooner we shall arrive at the time when we can all return to peacetime operations.

The overwhelming majority of oil men have long since made plain their conviction that they were fortunate in having their wartime operations guided by Administrator Ickes. Conversely, I can assure them that I have never known a man to feel such pride in a group of men as Administrator Ickes feels in the oil industry. He started his job on the theory that oil could best do its job in this war with the minimum of direction from Government and minimum of interference by Government—in other words that the arrangement should be one of teamwork rather than one of czar and subject. He has held steadfastly to this theory, and I have no hesitation in saying that I am certain that all parties—and the public as well—will agree that it has proven its merit beyond all dispute.

Protection of Plant Facilities Is Vital Assignment

by Allen A. Jergins*

THE Facility Security Division is primarily interested in maintaining a continuity of supply of petroleum and its products to meet the civilian needs and those of the armed forces. In order to accomplish this, the plants which are now supplying petroleum products must be protected against fire, sabotage and other destructive acts. This division has been established to make available technical men and plant-protection engineers who have had long experience in the special hazards of the oil industry.

Some months ago, an agreement was effected between the Army and PAW by which the Army's program of protection of petroleum plants was revised to provide a joint operation between the Army and PAW. Joint inspections of those plants of major importance to the war program are being made by representatives of the Army and of this division.

The plant protection policy of the Facility Security Division is to take a plant in its "as is" condition and improve that condition to the maximum extent practicable with the least expenditure of critical materials and manpower. It is frequently possible to materially improve existing situations by very simple and yet effective and practical means. Aside from methods for the control of sabotage and subversive acts, attention is largely concentrated on fire prevention and protection, which are subjects of prime importance to the petroleum industry. The program in this respect is built around three cardinal principles: First, the control of fire spread; second, the elimination of fire hazards, and third, the provision of means for the extinguishment of fire.

Because of the mobility of petroleum, i.e., the ease with which it flows, the most important problem is the control of fire spread. The conventional method of accomplishing this objective is by means of dikes or fire walls. In actual experience, however, their practical value has been to retain relatively small spills. Of greater importance in the control of fire spread is the construction and maintenance of oil tanks; factors which will act to retain the oil in the tank if it should become ignited.

The second point in the program is the elimination of fire hazards and the betterment of fire risks. This is fire prevention in the full sense of the word. A great deal of the activity of this division is directed toward the removal of those conditions which cause fires. In general, the correction of such items involves little labor, materials or money.

The third fire protection objective is the matter of fire extinguishment. Some difficulty is being experienced along these lines, as fire-fighting equipment involves steel, brass, iron, rubber, pumps and facilities, all of which are on the critical materials list.

Excellent support and cooperation has been given the program by the industry. For many years management has been particularly aware of the risks and hazards of fire in the petroleum industry. As a result, the precautions taken by oil companies during peacetime have placed their plants in a good position to meet the added responsibilities under war conditions.

*Director, Facility Security Division.

Era of Abundant Production Fading

by D. R. Knowlton *

D. R. KNOWLTON

IN the producing branch of the petroleum industry, where for the past 15 to 20 years restriction of crude-oil production has been necessary to limit withdrawals to reasonable market demand and to prevent physical waste, we are now passing from an era of plenty and inflated potentials into an era of scarcity and unmet quotas.

It has been only a short time ago that the oil producers of California, Kansas and Texas were insisting, at meetings of operators or at hearings of state regulatory bodies, that their fields and properties were capable of producing at rates greatly in excess of prorated allowables. Such claims do not prevail now. Except for a few fields in the Gulf Coast and in West Texas, every field in the nation is producing at, or in excess of, its maximum efficient capacity.

At the present time, the chief worry of most producers is that their fields are being drawn upon too heavily—not that their field output should be increased. They are now fearful that the higher present producing rates and the anticipated higher rates of the immediate future will damage the sustained producing abilities of the fields as well as ultimate recoveries. For example, during the early part of 1942, when there was an outlet for only approximately 250,000 bbl. of crude oil per day, the PAW (then the OPC) was besieged with appeals from Kansas operators to increase the certified quotas to 325,000 and 350,000 bbl. per day. As transportation bottlenecks were eliminated and it became possible to move greater quantities of crude oil out of Kansas, the certified quota was increased gradually to slightly over 300,000 bbl. per day. With the increased rate of withdrawal, water began to show up characteristically in the wells of the Arbuckle lime—the source of about 80 per cent of Kansas oil. Consequently, pleas for higher quotas have been replaced by pleas for lower quotas.

In California, the present crude-oil-production rate of 780,000 bbl. per day is its maximum efficient capacity although as recently as 2 years ago many persons believed and made frequent claims that the state could produce 3 million barrels per day. It is now fully recognized that such claims were grossly exaggerated and inconsistent with operating experience.

Arkansas, Oklahoma, Michigan, Mississippi, and Illinois are producing more than would normally be desirable from the standpoint of operating efficiency if it were not for the urgency of war. The same is true of most of Texas and Louisiana. It is only in the Gulf Coast area and in West Texas that some few fields have added productive capacity in any appreciable quantity. Estimates of the existing amount of excess capacity in these areas have been scaled downward on the basis of the disappointing experiences which have resulted, in other areas, from opening the wells to capacity production.

Productive Estimates Lowered

While we are being forced to reduce our estimates of efficient productive capacity, the requirements for petroleum products, and hence for crude oil, are increasing greatly and rapidly as the war program progresses. During June our crude-oil production was approximately 3,980,000 bbl. per day. During July, production will be up about 100,000 bbl. per day and in August there will undoubtedly be a further increase. During the fourth quarter of this year, as the two big-inch lines to the East Coast and the refinery expansion program for making war products, such as aviation gasoline, reach completion, the essential requirements for crude oil will mount so as to absorb every barrel of excess efficient capacity.

First, and most apparent, of these steps is to increase our rate of development drilling on proven lands. Since December 23, 1941, we have been conserving steel by drilling wells on wider spacing. As a result the material in industry warehouses has been made to suffice for a period of 1½ years, during which time limited amounts of steel were available and productive capacity was not a problem. The producing branch of the industry is now receiving larger allotments of steel, and it is time to drill some of the wells that have been deferred. Several supplementary orders have been issued recently which permit closer well spacing. In California, Supplementary Order 4 has resulted in a sharp increase in activity, in addition to that caused by the recent increased price for heavy oils. In eastern Kansas, eastern and southern Oklahoma, and in North Texas restrictions have relaxed. The Cut Bank and Kevin-Sunburst fields in Montana have received field-wide exceptions permitting closer spacing.

Further relaxations may be in order. Western Kansas may justify 20-acre spacing to increase the current capacity. In other areas dual completions and twin wells may be needed.

Besides the discovery of new fields, the most important source of added productive capacity for the war program lies in secondary recovery. For years, engineers have pointed to the 3 billion and more barrels of oil recoverable by secondary methods at present or slightly higher crude-oil prices. It is not inconceivable that this quantity can be increased several fold at costs which are within reasonable range. One significant feature of water-flood secondary recovery is that approximately 50 per cent of the reserves are produced during the first 2 years of the operation of the project. This fact makes secondary recovery a particularly attractive source of oil for the war. We can get it fairly quickly.

All of the sources of added productive capacity are unattractive at the present price of crude oil. A producer has little reason to engage in such activity except to maintain his position as a producer. Without additional incentive none of these activities will be sufficiently followed to develop the productive capacity needed to meet our anticipated requirements.

Material scarcity has caused trouble to many producers, but the situation is better today than it has been for some time, and it should continue to improve. Wartime controls must continue in order to keep materials flowing, but they will not present an undue burden on operators.

*Director of Production.

Refining Closely Coordinated

by E. D. Cumming*

IN war even more than in peacetime the need for oil is a need for products. The refinery is the core of the entire vast industry. All of the other functional industry branches depend on it. No matter how much crude can be gotten out of the ground it can be effectively utilized only to the extent that it is transported to the refinery, converted into products, and these in turn transferred to points of consumption.

The Refining Division of PAW, working in close cooperation with other functional divisions which concern themselves with production, transportation, distribution, and other operations, has as its task the supervision of the country's petroleum refining in order to assure to the armed forces their requirements of petroleum products, and to civilians those necessary for essential purposes. The task has been made more difficult by the ever-increasing demands of mechanized warfare not only for aviation gasoline and lubricants but for gasoline for tanks, trucks and other motorized equipment, fuel oil for ships, and many other ultimate products not as glamorous but just as necessary as airplane fuel. The task has been complicated further by the fact that East Coast refining and consumption, a not inconsiderable portion of the whole, had long been dependent on tankers, now unavailable, for supplies of crude and products. That the task is being effectively accomplished is due in no small part to the wholehearted cooperation of industry acting directly, as well as through committees set up under the sponsorship of PAW.

*Director, Refining Division.

E. D. CUMMING

Aviation Program Outstanding

The most spectacular achievement of the refining branch of the industry has, of course, been the production of aviation gasoline. In January 1942 there were 22 refineries within the United States which were making 100-octane gasoline or a major ingredient such as base stock or blending agent. In June 1943 there were 47 such refineries. Construction work is still in progress at 28 of these 47 refineries and 26 other refineries, and month by month the amount of aviation gasoline produced by these plants is increasing. Moreover, this June, 72 refineries were making codimer, which on hydrogenation becomes a valuable component of aviation gasoline. As a result, June figures showed 126 domestic refineries contributing or scheduled to contribute to the presently projected production of 100-octane gasoline.

The manufacture of aviation gasoline in the amounts required has involved compressing into less than 2 years technological progress that would normally have required many times this period. While even before the war many sulfuric acid alkylation plants were in operation this process has been improved, and is being operated on a constantly expanding scale. Other alkylation catalysts, notably HF, have been developed to the point of commercial acceptance, and a large part of the program is based on HF alkylation. The limited supply of natural high-octane-value base stock is being augmented by the construction of a large number of catalytic-cracking plants of the Houdry fluid and Thermofor type. Raw materials are being made available by the installation of isomerization units, and by the modified operation of existing thermal-cracking facilities.

The required facilities unfortunately do not spring into existence overnight. Between the idea and its execution many steps are required. As has been referred to already, industry cooperation has been obtained on a voluntary basis. Proposals for manufacture of 100-octane gasoline (as well as for other war products) are considered by the New Facilities Section of the Refining Division from the standpoint of requirement of critical materials, proposed location, efficient utilization of available crude, and the dollar cost of the facilities as well as the cost per gallon of aviation gasoline to be produced from them. The processes to be used in each case are the selection of the individual refiner. (In some cases the "individual refiner" has been a group of small refiners who individually may not have the necessary crude capacity to justify the proposed installation.) On approval by the New Facilities Section the project is recommended to WPB for inclusion in a program determination, and the assignment to it of the necessary priorities. The Construction Section of the Refining Division, which is being established as an independent division, next undertakes the complicated task of scheduling components, integrating the project with other projects not only in the aviation program but in the other "must" programs, and of generally expediting the program. But even with the best of scheduling, material and labor shortages result in an interval of many months between the approval of a project and the production from it of 100-octane fuel. In the meantime the Operations Section of the Refining Division has been working on the problem of securing a supply of necessary crude, and the Aviation Section has been working up a schedule for the most effective use of the components to be made by each project. It is an interesting fact that all of the producers of aviation-gasoline components are being handled as one, and the blend-

ing of manufactured components into the finished product is made with ultimate maximum production in mind under existing transportation limitations. Where conditions warrant it, alkylate from one plant will be blended with base stock produced many miles away, while the base stock from the first plant is otherwise utilized. By this procedure, amazing increases in net outturn of 100-octane gasoline from existing facilities have been achieved.

But 100-octane aviation gasoline is not the whole story. Not only must 91 octane and other grades of aviation gasoline be produced in the required amounts, but from selected crudes must be made large amounts of aviation-engine lubricating oil, and other lubricants meeting the exacting specifications of the military forces. After the military demands for these products and fuel oil and special materials have been satisfied, the problem of meeting essential civilian requirements must be solved. Motor fuel for civilians, and fuel oil, are to some extent byproducts of aviation-gasoline manufacture. But considerable quantities must still be made in nonwar-product plants.

Working closely with appropriate industry committees the Refining Division of PAW obtains in advance forecasts of the amounts of crude available for refining in each district. The crude oil is allotted first to the war plants, which are required to use a minimum amount for the manufacture of maximum war products, and what is left is allotted to the nonwar plants on an equitable basis. The scheduling of crude is among the responsibilities of the Operations Section of the Refining Division, which also assists in the formulation of operational directives controlling yields of products where necessary.

The Refining Division has the added responsibility of insuring a supply of petroleum raw materials to many of the synthetic-rubber plants. This is of itself a labor of considerable magnitude, all the more so because the raw materials involved come from the same petroleum cuts as supply the raw materials for vital components of 100-octane gasoline.

The Refining Division has been able to obtain the cooperation of the industry not only through the various industry committees in each district but also through the Aviation Gasoline Advisory Committee, the Lubricating Oil Advisory Committee, and the Technical Advisory Committee of the Technical Committee of the PIWC. The assistance of these committees and their advice as to manufacturing and development problems cannot be exaggerated. Through them, as well as through direct activities of the Refining Division, steps are being taken to make sure that each operator of a war plant has access to all available technical information which will assist him in carrying out his operations at maximum effectiveness. At the same time the division keeps abreast of the development of new processes which may make possible increased production of higher quality products in the months to come by the use of new components or catalysts or modified operating conditions.

The bulk of the war program of the refining industry is now built and building. The Refining Division is concerning itself with the inevitable problems connected with operation and blending. The materials bottleneck, is in process of being passed. The manpower bottleneck as regards operation of existing and new facilities, is being attacked. Close liaison has always been maintained with the armed services, WPB, Defense Plant Corp., Defense Supplies Corp., Office of Lend-Lease Administration, British Petroleum Mission, and other agencies instrumental in the manufacture and use of petroleum products for winning the war.

All Methods of Discovery Are Needed to Reverse Trend of Petroleum Reserves

by William B. Heroy*

IT is the function of the exploration branch of the oil industry to find the new fields and new pools required to sustain production. The measure of its success is the volume of new reserves found by the drilling of exploratory wells.

In a period which commenced in 1900 and ended about 1925, the volume of proved reserves was generally in close balance with the current annual production. There followed a period, 1925-1931, when the volume of new reserves discovered substantially exceeded production. This period was climaxed in 1930 with the discovery of the East Texas field. The discovery of that immense reserve and its ensuing rapid development overshadowed all other development activities for several years and may account for the low volume of discoveries in the years 1932 and 1933, when less oil was found in new fields than was produced from all reservoirs.

With the advent of proration, with its consequent stabilizing action on production, a new cycle of discovery was initiated in 1934 which extended through 1938. During this 5-year period, the total volume of reserves discovered was, in round figures, 9.6 billion barrels, 3.8 billion barrels more than was produced. By the end of 1938 the total proven reserves had been built up to the impressive total of 17.4 billion barrels, more than 14 times the production for that year. This rapid building up of reserves was unquestionably due, to a major extent, to the introduction of more advanced and more efficient geophysical methods. A means for finding structure so penetrating and with such great resolving power had been perfected and was so vigorously applied that in large areas it was almost an impossibility for a major structure to escape. During the latter part of this period, an average of about 250 geophysical crews was constantly engaged in the search.

The close of 1938 marks, approxi-

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W. B. HEROY

mately, a change in the trend of discovery. The reserves of new fields discovered in 1939 was only about a third of those found in 1938. The year 1940 was a better year, nearly as much oil being found as was produced, but 1941 fell back nearly to the 1939 level. The discoveries of 1942 cannot as yet be fully evaluated but the indications are that the fields discovered in that year will never yield much more than half of the oil produced during that year. For the 4-year period, 1938-1942, production was about 5.4 billion barrels while the reserves of new fields found probably do no exceed 3.9 billion barrels.

Exploratory Effort Unslackened

This reversal of trend was not in any degree due to a slackening of exploratory effort. The number of geophysical crews in the field steadily increased from 250 at the beginning to 330 at the end of the 4 years. Exploratory drilling also showed important increases, the number of wildcats completed in 1941 being 44 per cent greater than in 1937. There was a corresponding increase, also, in the number of successful wildcats drilled and in the number of fields found. But in spite of these apparently favorable trends in exploration and discovery, results—measured in terms of new oil discovered—were very unfavorable. The size of the new fields found dropped from an average of about 11 million barrels in 1938 to something like 2 million barrels in 1942.

I have previously stated that the proven reserves of the fields discovered up to the close of 1938 were then estimated to have total reserves of 17.4 billion barrels. An appraisal of the same fields at the present time would put their oil content at a much higher figure. In the light of present knowledge, our proven oil reserves were probably higher at the end of 1938 than at any time in the history of the industry. Since that time withdrawals have exceeded discoveries to the extent of about 1.5 billion barrels.

To what shall this change of trend be attributed? Was it due to a streak of "hard luck" or was there a deeper and more significant reason? We shall probably not fully understand the reasons for years to come, but one explanation "rears its ugly head" with increasing frequency: the thought that the crop of structural traps containing important oil fields has been largely garnered due to the efficiency of geophysical reaping.

As a practical nation we are, regardless of the causes, greatly concerned with these results. At a time when there is the greatest need to find new reserves at a rate in excess of current production the discovery rate is alarmingly low.

The discovery of new fields is dependent upon well-directed exploratory drilling. The number of exploratory wells drilled and the quality of the prospects tested both affect the result. In 1940, about one wildcat well in 20 drilled at random was successful, while one well in five drilled on prospects developed by technical methods was successful. Our need for new discoveries is so great that both methods of exploration must be used as effectively as possible. The rate of wildcat drilling for the first 5 months of 1943 was nearly 9 per cent higher than for the same period in 1942. If this rate of increase were sustained it would result in the completion in 1943 of about 3,350 wildcats, which would be the highest number in any year in the history of the industry. But the volume of reserves found per wildcat completed has shown a rapid decline over the last 7 years. Regardless of whether reliance is placed on random drilling or on technical methods it is apparent that the present rate of exploratory drilling falls far below the required level. To find 1,400,000,000 bbl. of new reserves, equivalent to present annual production, at the 1942 rate of discovery (proved and possible reserves) would require more than 5,600 wildcat wells if they were no more effective in finding new reserves than those drilled in 1942.

The discovery rate can, of course, be improved if prospects of higher quality can be found and tested. Geophysical operations are at an all-time high so that it is clear that the industry is, on the whole, earnestly searching for new prospects. While it is always hazardous, in advance of actual testing, to appraise prospects as to quality, many operators believe that it is becoming increasingly difficult to find attractive prospects and that, in general, the quality of recent prospects compares unfavorably with those found by means of geophysical methods in earlier years.

It is for these reasons that the Petroleum Administration for War has urged that the rate of wildcat drilling be increased to 4,500 wells for 1943 in the hope that, through an increased number of random wildcats and by the drilling of the best available prospects, the discovery rate may at least equal the withdrawals from underground reservoirs.

The industry is successfully solving the problems which it has faced successively in transportation and in manufacturing as a result of war conditions. It is now faced with similar problems in production and in exploration. The problems of exploration are more elusive, for no one can say with assurance just where oil will be found or how large the newly discovered fields will be. The nation cannot afford to wait until the situation becomes desperate before adequate action is taken. The technical resources and skilled manpower of what we regard as the world's greatest industry must be fully mobilized and thrown into action in the battle of oil finding.

War Hastens New Concept on Value of Nation's Natural Gas

by E. H. Poe*

JUST over a year ago, Petroleum Administrator Ickes created the Natural Gas and Natural Gasoline Division of the Petroleum Administration for War and charged it with the task of securing the industry's maximum contribution to the war effort. To the division was entrusted the safekeeping of the natural-gas industry's stake—the nation's 95 trillion cubic feet of proven connected reserves—in wartime. The security of that trust, both from the standpoint of public and industry, may best be gaged by an analysis of division accomplishments.

Low-recovery factors born of the attempt of individual operators to obtain more than their just share of underground reserves have made the petroleum industry, as a whole, acutely aware of the economic shortsightedness of the long-prevalent conception—that a barrel of oil aboveground is worth two in the reservoir. Even so, the entrance into negotiations of a third party, the Government, with no interest save the conservation of natural resources and their efficient, equitable distribution, has had a highly salutatory effect in the promotion of unitized-field operations. But if the importance of utilizing gas in its original role of providing energy for lifting oil from the reservoir has been stressed, there is small cause to fear, even locally, as one writer has, that there will be an insufficiency for fuel

*Director of Natural Gas and Natural Gasoline Division.

use. To the contrary, today's return of gas to the reservoir assures tomorrow's supply of both oil and gas.

Unitization has sometimes proved impossible, usually because of a diversity of interests of property owners. An alternate conservation route has then been followed by shutting in high gas-oil ratio production, or connecting to consumer outlets gas hitherto blown to air. Notable decreases in gas wastage were effected this past year through a combination of conservation measures. Even in District 5, where a heavy increase in oil production was necessitated by the needs of forces in the Pacific, and where the bulk of the gas is produced in conjunction with oil, an additional saving of 20 per cent was effected.

Demands Being Satisfied

Whereas conservation has been urged against tomorrow's needs, deliverability today has received primary consideration. Analyses of seasonal demands have permitted long-range planning, with the result that increased domestic, commercial and industrial demands particularly were met this past winter and will be met in coming winters. The use of underground storage adjacent to centers of distribution as protection against heavy seasonal demands has been urged with a high degree of success. A notable example now in operation is the depleted Playa del Rey field in the metropolitan Los Angeles area, gas from which will be available this winter. Elsewhere, in the heavily industrialized Appalachian area, storage was built up last year over 25 per cent by one company against increasing seasonal demands.

Construction of transcontinental gas lines may prove an impossibility for the duration because of the critical material shortage. However, this division of the PAW and the Office of War Utilities of the War Production Board, working in conjunction, have arranged to supplement delivery of gas by 50-100 million cubic feet per day in District 1 by additional looping of the Panhandle Eastern Pipe Line Co. line from Texas to Michigan and by a 120-mile interconnection with East Ohio Gas Co. properties. District 2's industrial area, in which a deficiency was felt in some degree this past winter, will benefit by a 240-mile line extension which will draw 140 million cubic feet of gas per day from the Hugoton field of Oklahoma and Kansas.

More than this, careful planning has made possible release of several gas lines for the transportation of oil. The Stanpac line in the San Joaquin Valley of California may be cited as an example, conversion of which made sorely needed oil available to the San Francisco Bay area without impairing gas delivery in that area. A study of the Rio Vista field of

E. H. POE

northern California indicated that dry gas could be withdrawn in sufficient quantity by limited addition and extension to available facilities to satisfy local needs. Natural gas is being delivered where and when it is needed, and such delivery will continue for the duration, whether by carefully supervised, localized drilling programs or by integration of supply sources and transportation facilities to meet consumer demands across the nation.

Wartime conditions find natural gas and natural gasoline key components in the greatest technologic development in the history of petroleum science. Developments in hydrocarbon chemistry are daily resulting in increased production of materials vital to the war effort. New and improved processes are being perfected, and dissemination of information relating to them is being directed into the proper channels by the Natural Gas and Natural Gasoline Division. Industrial research has been concentrated on utilization of the more abundant light hydrocarbon fractions, with the result that important gains have been made in increased production of constituents essential to war programs and in the development of superaviation fuels and blends.

In the natural-gas industry some 11 per cent of marketed production was utilized last year in the production of carbon black, fundamental to the success of the synthetic-rubber program and presently producible only from gas. Improved methods of production—furnace and thermatomic—have resulted in increased yields with smaller expenditures of natural gas than were prevalent with the older contact method. Meanwhile, research on the possibilities of utilizing natural gasoline from this manufacture, with possibly greater yields per resource unit expended, have been fostered by this division.

The production and use of natural-gasoline constituents of prime importance in the aviation-fuel, synthetic-rubber, and explosives programs have been coordinated by this division. Supply sources have been analyzed, as have production outlets. As a result of a comprehensive study of steel expenditure versus output in prewar plant construction, it has proved possible in directing construction to obtain maximum increases in productivity at minimum damage to the nation's metal stockpile. Over 35,000 tons of critical material expended since June 1942 are yielding increased production approximating 51,000 bbl. per day of natural gasoline and related hydrocarbon fractions. Notably, some 48 per cent of the increase has come from minor alterations in existing facilities and extensions thereto, while only 39 per cent of the metal tonnage has been diverted to these uses.

The development trend in the Southwest has focused attention upon the increasing importance of District 3 in the nation's natural-gasoline picture. Condensate-field discoveries, characteristic completions in recent years of deeper drilling, have increased from 12 to 30 per cent of the annual total discoveries in the past 7 years. A new condensate-bearing area, with promising potentialities, has been recently discovered in the Permian basin. With these new reserves to draw against, and with District 3's prewar natural-gasoline plants already making the outstanding contribution to production from established fields, this district must be looked to for the bulk of natural-gasoline production in the war and postwar years. It currently supplies about 57 per cent of the total.

Reserves Used to Maximum

The division has accordingly worked with industry to assure maximum utilization of the district's reserves during the war and thereafter. The expanded construction program for new plants is now beginning to pay dividends. In the third quarter alone, 17,000 bbl. per day of natural gasoline and allied products, representing a daily average production increase of 12 per cent, will be added. Within 2 years from today, based on construction and development now contemplated, increases totaling 62 per cent will be realized.

The Natural Gas and Natural Gasoline Division has fulfilled its objective and may look to the future. Its establishment has permitted the interlocking of regional supply-demand pictures to form a single one of national scope. Tomorrow's problems have their solution in today's decisions, and Government and industry are today deciding things together.

Controlled Materials Plan Single Source for Oil-Industry Equipment

*by Frank A. Watts**

THE Controlled Materials Plan is now regulating the flow of materials from producers through manufacturers, distributors and suppliers to all ultimate consumers including petroleum-industry operators. All others acquiring materials for final use in the petroleum industry must secure materials from the same general sources and through the same controlled procedures.

During the first quarter of this year, all ultimate consumers of carbon and alloy steel, copper and aluminum, and items which were made in whole or in part from these materials, followed previously established procedures in acquiring materials with which to conduct essential operations. In general, two media were available to petroleum-industry operators — Preference Rating Order P-98-b and PD-200 project applications with their resultant P-19-h certificates.

Introduction of Plan

During the first quarter of this year, the Controlled Materials Plan was announced and extensive missionary work was conducted to familiarize all industry with every phase of the plan. The second quarter of the year was known as a transition period. During this period materials were obtainable under previously established programs, or alternately, under the Controlled Materials Plan. Since this plan provides a balanced supply of materials for the manufacture or assembly of all items which are determined as essential and for which there is an authorized program, it is accepted as the only workable plan which provides for a flow of materials from producers to ultimate consumers through all intermediate stages.

The Controlled Materials Plan requires that petroleum-industry operations be projected, by quarters, several quarters in advance so that the Petroleum Administration for War as claimant agency for the petroleum industry can be allotted sufficient materials to reallot to petroleum-industry operators, equipment manufacturers and other prime consumers, materials with which to conduct planned operations, and for maintenance and repair purposes.

*Director of Materials Division.

Although some confusion has resulted from the establishment and execution of the plan, it is fitting into this country's war program more adequately and more impartially than did any other plan. No substitute is known for it. It is a practical and workable medium of providing a balanced and steady flow of materials from producers to ultimate consumers for this country's war program and for essential civilian enterprises.

Preference Rating Order P-98-b was reissued May 15, 1943, to provide an order which would make materials available for petroleum-industry operations under the Controlled Materials Plan.

Field and mill stocks of oil country tubular goods were established under the plan to guarantee a supply of tubular goods for all wildcat operations for which casing and tubing are required and for those operators who are unable to plan their operations sufficiently in advance to enable them to order their requirements on a normal schedule from the pipe mills.

Proper and coordinated planning on the part of the petroleum industry, the Petroleum Administration for War, and the War Production Board should provide an adequate, but minimum, supply of items of material made in whole or in part from steel, copper, or aluminum which are required for petroleum-industry operations in the production, transportation, or refining of petroleum or its products as part of this country's war program. This is also true of petroleum-equipment manufacturers, oilfield supply companies, distributors, manufacturers and producers.

FRANK A. WATTS

As direct and indirect results of the Controlled Materials Plan, the manufacture of many items has been scheduled. This procedure requires distributors, consumers or contractors who require the use of the scheduled items, which are scheduled under Order M-293 or otherwise, to place orders for these far enough in advance to enable the Petroleum Administration for War and the industry divisions of the War Production Board to schedule the manufacture and delivery of the items. The plan and its attendant scheduling procedures require that normal and construction operations be planned by petroleum operators further into the future than is normal practice in the petroleum industry.

PAW Is Industry's Buffer

The Petroleum Administration for War acts as a prophet and as a buffer for the petroleum industry to provide materials required for normal and expansion operations. With few exceptions, materials are now flowing from manufacturers through distributors or direct to operators at a rate equal to the industry's need for and use of these items.

When operators, contractors, equipment manufacturers or other ultimate consumers require materials for petroleum-industry use, including construction, normal operations, or maintenance and repair purposes, and they experience difficulties in obtaining these materials through procedures normally available to them, PAW is usually able, in cooperation with the industry divisions of the War Production Board and others, to expedite delivery of the materials.

It is necessary under the Controlled Materials Plan and Preference Rating Order P-98-b that operators and their established suppliers continue to work in close harmony to provide adequate stocks of materials in the hands of suppliers or operators for normal operations and for emergencies. By forward planning on the

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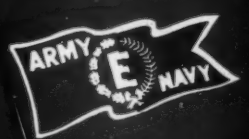

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part of manufacturers, operators and suppliers, there is every reason to believe that, under the Controlled Materials Plan, materials will be available for petroleum operations in amounts equal to the actual requirements of these materials. Because materials are required in increasing quantities for this country's war program, decreased amounts of material are available for other than essential industry or civilian enterprise use.

When controlled materials are allotted by the Petroleum Administration for War to petroleum-industry operators or other consumers, it is necessary that orders for these materials be placed with all possible dispatch and then scheduled for delivery. To the extent that allotments are received from PAW by industry operators or other consumers and materials are not acquired or reallotted, it is essential that the allotments be promptly returned to PAW, who will immediately make these available for some one's use in the petroleum industry.

Research Proves Worth in Affording Necessary Data

by E. B. Swanson*

WAR creates new demands for statistics as well as for most other commodities. Peacetime figures, like peacetime airplanes and other products are inadequate to the needs of war.

At the beginning of the present conflict, economists who were faced with the task of estimating supply and demand for petroleum products had a vast array of figures at their disposal and were in an infinitely better position than they were at the start of World War I, when the Government didn't even have a complete list of refineries operating in this country, much less a knowledge of their capacities and runs to stills. Necessity for adequate data on all phases of supply during the first World War stimulated the compilation of statistics which were carried on after the armistice and immensely benefited the entire petroleum industry.

While the statistical data available on December 7, 1941, were enormous, rationing and other problems created by the current conflict presented entirely new statistical demands. As a result of necessity, therefore, the industry and the Government in complete cooperation began the collection of much information sorely needed to obtain a comprehensive picture of petroleum demand.

A good start was made in 1942, particularly with the creation of the Petroleum Industry War Council's Statistical Subcommittee, the Joint Tank-Car Subcommittee, the Joint Barge Subcommittee, and the various industry committees in each district. Each group individually devoted a vast amount of time and energy to its work and the results have been highly important to the war effort.

The development of reliable statistical reports requires considerable time and a great amount of painstaking effort because of the variety of petroleum products and the complexity of distribution. In wartime this complexity is increased due to secrecy that necessarily surrounds all movement of supplies to the armed forces.

Nevertheless, by the beginning of this year, detailed records of barge and tank-car movements throughout the country were available on a weekly basis, making possible the efficient use of such transportation. From the Joint Tank-Car Subcommittee's records, which have been steadily improved by experience, special studies of the movement of individual products are made by the Research Division as the need arises, and regular weekly tabulations are issued to governmental and industry organizations showing the amounts of each product shipped each week from district to district and from zone to zone in the eastern states.

During a period of acute shortage of supply, such as the eastern seaboard has experienced during the past year, it is necessary to know the facts about conditions in local areas. Petroleum Administration for War Directive 59, issued December 12, 1942, set the necessary machinery in motion for collecting this essential information. By the middle of February, the Supply and Distribution Committee of District 1 was receiving weekly reports of inventories and withdrawals from each of the 70 terminal areas in that critical region. The Research Division of PAW analyzes these records and distributes weekly reports to the divisions and committees who need this information. These reports are now indispensable, and represent a major contribution to the war.

Similar information is now being compiled in the Midwest by the Supply and Distribution Committee for District 2 as a result of PAW Directive 65, issued March 17, 1943; and the work was extended to District 3 when Directive 67 was issued May 27, 1943.

Statistics on refining also have been steadily improved to such an extent that detailed reports on the complete operation of each plant in critical areas are now available.

The outlook for the remainder of this year, therefore, is for a steady improvement in the basic material from which the supply and demand forecasts are calculated. This will mean a constant improvement in the distribution of available supplies, the prevention of acute shortages in local areas and the more efficient utilization of all facilities.

E. B. SWANSON

*Director, Research Division.

Oil Transportation Transformed by War

by J. R. Parten*

J. R. PARTEN

PROBABLY the most drastic readjustment that the petroleum industry of the United States has had to face is the transition of the eastern transportation pattern from one that normally was about 95 per cent ocean borne to one that today is almost all overland or by protected waterway. This transformation began in the early part of 1941 when some 50 American flag tankers were transferred for the movement of oil to Great Britain. But the real impetus came with the declaration of war late in the year 1941. Immediately thereafter, steps were taken to employ to the fullest extent possible every substitute facility that could be made available to meet the changed requirements.

After Pearl Harbor and the declaration of war between the United States and the Axis Powers, ocean tankers were assigned in rapidly increasing numbers to the vital task of supplying oil to the fleets and armies of the Allied Nations in all quarters of the world. Continued transfers of bottoms to direct war service have cut deeper and deeper into the tank-ship movement of oil to the Atlantic seaboard.

Although present overland and inland waterway movements of petroleum are far from sufficient to meet prewar domestic demands plus offshore military requirements, they were built from about 200,000 bbl. a day in December 1941, until now they approximate the average peacetime tanker rate of some 1,400,000 bbl. a day. This is an accomplishment to which the historians may well devote more than just a few passing words when they come to tell the story of the winning of World War II.

Yet, having reached and passed the 1,400,000-bbl. mark in a year and a half, there is to be no stopping there. The demands upon substitute transportation methods still mount.

Before the end of 1943, according to our forecasts, we shall have pushed that transportation capacity to approximately 1,600,000 bbl. per day. For the second quarter of 1944 we have every reason to believe that the capacity will be more nearly 1,800,000 bbl. every 24 hours. In other words, we will not only have achieved the equivalent of the prewar tanker rate — we shall have exceeded it by some 400,000 bbl. per day. But this is an oil war. The demands of the military forces are enormous and they may be expected to continue to increase. Oil transportation must keep pace.

Few Americans were aware that our petroleum industry was almost unique in that in peacetime it had developed its own long-distance, mass-volume, low-cost transportation system, using the ordinary common carriers of commerce only for secondary distribution, and those to a limited extent. That transportation system had a dual backbone of tankers and pipe lines, by which large volumes of petroleum products were moved long distances at costs so low that no other form of transportation could compete. In the days of peace, gasoline moved from Houston, Tex., to New York City via tanker at a cost of ½ cent per gallon, or less. The railroad tank-car cost was about 5 cents per gallon, in a period when 0.125 cent per gallon difference would swing a huge contract.

Planning Brought Results

Thanks to careful planning, to the most painstaking work and the sacrifice of private interest to the nation's cause, overland and inland waterway movements of petroleum have been increased seven-fold in a span of 18 months.

The men of oil know how Government and industry, working together, have met this responsibility; but it will be well to recapitulate, even if only for purposes of the record. A major upset of Axis strategy has been accomplished:

1. By assigning 80,000 tank cars to the exclusive service of District 1. Seventy-four thousand of these cars are in service moving petroleum into the district and 6,000 are operating entirely within the district. These 80,000 cars represent more than 74 per cent of all the tank cars in petroleum service in the nation, and nearly 80 per cent of the total tank-car carrying capacity of that service.

2. By fostering and building up an unprecedented volume of drum shipments in box cars, the result of which was to push total rail movements to in excess of 1,000,000 bbl. per day a few weeks ago.

3. By vigorously prosecuting a pipeline program involving the taking up and relocating of more than 2,600 miles of second-hand pipe; the laying of a total of approximately 4,500 miles of new pipe lines; the reversing and converting of nearly 3,400 miles of other lines, together with relocation and rearrangement of storage facilities. By the end of the calendar year that program will have been entirely completed, except for two projects: The 20-in. Texas-East Coast products line and the 16-in. crude line from Sundown in West Texas to Drumright, Okla.

Although the 20-in. products pipe line should be operating at partial capacity all the way to the East Coast by the end of this calendar year, the full complement of pump stations cannot be installed until the spring of next year to permit the operation of the line at its rated capacity of 235,000 bbl. per day of gasoline. The line from West Texas to Drumright is scheduled to be in operation in February. Of course these completion dates are dependent upon the scheduled delivery of required materials.

4. By making the maximum use of the protected waterways through a program of conversion and construction of equipment and a better utilization of existing equipment through elimination of crosshauls.

5. By substituting tank trucks for tank cars on short hauls wherever possible, thus realizing an estimated total of 25,000 tank cars made available for petroleum service to the East Coast.

6. By reorganizing the entire petroleum distribution system of the United States by the general adoption of the zoning plan.

*Director, Transportation Division.

World Production Reviving

by J. P. O'Donnell

WORLD production of crude oil in the first 6 months of 1943 was slightly less than in the corresponding period of 1942 but it had begun to emerge from the wartime slump it experienced in the second half of last year when it was restricted most severely by the lack of transportation and as a result of the destruction of producing fields earlier in the war. World production for the first half of 1943 is estimated at 1,043,532,000 bbl. which compared with an estimated 1,048,248,000 bbl. for the like period of 1942, a decline of 4,716,000 bbl. or about three-quarters of 1 per cent.

The first 6 months of this year witnessed the first improvement in the transportation situation since the beginning of the war and also saw a return to production of some areas that had been damaged or destroyed earlier in the war. The effect of these factors will be felt more in the latter part of the year and for the first half they were outweighed by the increasing military demands on United States' production. Since most of the United Nations' aviation gasoline capacity is located in this country and since it is the closest source of adequate oil supplies to the European and African war theaters, military dependence on this country for oil has been very great.

U. S. Rise Offsets Declines

Even though there have been severe restrictions on civilian consumption of oil products, the total demand for military and civilian uses required an increase in the production of the United States of approximately 4 per cent. This is equivalent to about 30,000,000 bbl., which was sufficient to offset 80 per cent of the decline elsewhere in the world. As a result of the military dependence on this country, it increased its proportion of the world total from less than 65 per cent to 68 per cent. This trend is developing a strain on the producing resources of the United States so that it is advisable to shift some of the load to other countries.

Shifting of the source of military requirements from the United States to foreign fields is becoming possible as a result of the improvement in transportation facilities. Submarine warfare, which a year ago thoroughly disrupted Western Hemisphere trade routes has been so completely overcome that the movement of vessels in these waters is now almost free of hazard. This will make the production of Latin-American countries again accessible to world markets as soon as tanker capacity is provided. It is estimated that a minimum of 500,000 bbl. per day is immediately available in three of the more important and most accessible of these countries, Venezuela, Mexico and Colombia. Since tanker construction is now exceeding losses and has yet to reach its peak, it is apparent that the necessary vessels are becoming available.

It is probable as a result of the need for and the improving ability to shift the source of supply from the United States to other countries that the latter will experience an increase in production in the last half of 1943. It is impossible for them to return immediately to their early 1942 or late 1941 highs but it seems that a gradual growth from the low levels at which they have been operating for the past 16 months is certain to be accelerated during the remainder of this year.

Venezuela at Half Potential

Venezuelan production in the first part of 1943 averaged slightly more than 400,000 bbl. per day, which is about 55 per cent of its preslump high and less than 50 per cent of its proven potential. Venezuela's prospects are favored by its proximity to the large Caribbean refining area and by the fact that Lake Maracaibo crude is particularly well suited for the production of residual fuel oil. Importation of heavy fuel oil by the United States has been necessary for several years and with demands growing with industrial expansion, this need has likewise grown.

(Continued on Page 118)

ESTIMATED WORLD CRUDE-OIL PRODUCTION

(All figures in 1,000's of barrels)

	Total			Daily average	
	1943	1942	Change	1943	1942
North America:					
Canada	5,032	5,300	—268	27.8	29.3
United States	709,770	678,538	+31,232	3,921.4	3,748.8
Mexico	16,000	21,025	—5,025	88.4	116.2
Total	730,802	704,863	+25,939	4,037.6	3,894.3
South America:					
Argentina	12,300	11,600	+700	68.0	64.0
Bolivia	185	150	+35	1.0	.8
Colombia	2,105	8,825	—6,720	11.6	48.7
Ecuador	800	815	—15	4.4	4.5
Peru	6,750	6,525	+225	37.3	36.0
Trinidad	13,000	10,250	+2,750	71.8	56.6
Venezuela	72,500	89,500	—17,000	400.5	494.4
Total	107,640	127,665	—20,025	594.6	704.8
Europe:					
Germany[1]	5,900	6,535	—635	32.6	36.1
Hungary	2,170	1,635	+535	12.0	9.0
Italy[2]	720	700	+20	4.0	4.0
Rumania	18,900	19,200	—300	104.4	106.1
U.S.S.R.[3]	109,150	119,750	—10,600	603.3	661.6
Total	136,840	147,820	—10,980	756.3	816.8
Asia:					
Bahrein Island	4,000	3,620	+380	22.1	20.0
Burma	....	2,000	—2,000	....	11.0
India	1,300	1,250	+50	7.2	7.0
Iran	38,000	37,800	+200	210.0	208.8
Iraq	7,250	7,050	+200	40.0	38.9
Japan[4]	1,900	1,900	....	10.5	10.5
Neth. E. Indies[5]	8,500	7,150	+1,350	47.0	39.5
Saudi Arabia	3,000	3,000	.....	16.6	16.6
Total	63,950	63,770	+180	353.4	352.3
Africa:					
Egypt	3,800	3,800		21.0	21.0
Other	500	330	+170	2.7	1.8
World total	1,043,532	1,048,248	—4,716	5,765.6	5,791.0

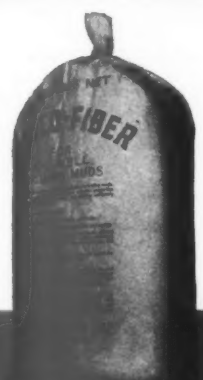
[1]Includes Austria, Czechoslovakia, Poland, France. [2]Includes Albania. [3]Includes part of Sakhalin. [4]Includes part of Sakhalin, Formosa. [5]Includes Brunei, Sarawak.

MUD SERVICE *by* MAGCOBAR

MAGCOGEL BENTONITE, Colloidal Gel-Forming, Wall-Building Material, is practically 100% pure colloid manufactured from the finest Wyoming bentonite available. The suspending and wall building qualities it imparts to the drilling fluid are unsurpassed.

MAGCO-CLAY HIGH-YIELD was developed to provide a low-cost, high-yield clay for spudding in, core drilling and work-over jobs where a low-weight mud is desired. It is also recommended for use in drilling anhydrite and salt contaminated formations. Mixed to weigh 8.9 pounds per gallon, the viscosity is 17.5 centipoises, filtrate 9.0 cc. A.P.I., pH. 5.8 and yields 55 bbls. per ton.

MAGCO-CLAY STANDARD is a high quality work-over clay having a low filtrate, high yield and is easy mixing. Mixed to a weight of 10 pounds per gallon, the viscosity is 17.5 centipoises, filtrate 11.5 cc. A.P.I., pH. 4.9 and yields 18 bbls. per ton. Its low pH. resists flocculation by salt water.



MAGCO-FIBER is a soft cellulose fiber with a bentonitic coating whose overlapping fibers form a coating which is impervious to water. When added to the drilling fluid it seals fractured, fissured or porous formations and thus aids in restoring lost circulation.

MAGCO-MICA is an efficient wall building material recommended for use in conjunction with regular drilling muds to prevent loss of water to the formations and to correct mild cases of lost circulation. Its flake shape allows it to be deposited against the walls of the well bore by the circulating pressure.

MAGCOBAR
Chemicals

Ample stocks of chemicals, including: tetra sodium pyrophosphate, sodium acid pyrophosphate, quebracho, caustic soda and sodium bicarbonate, are maintained at all MAGCOBAR distribution points.

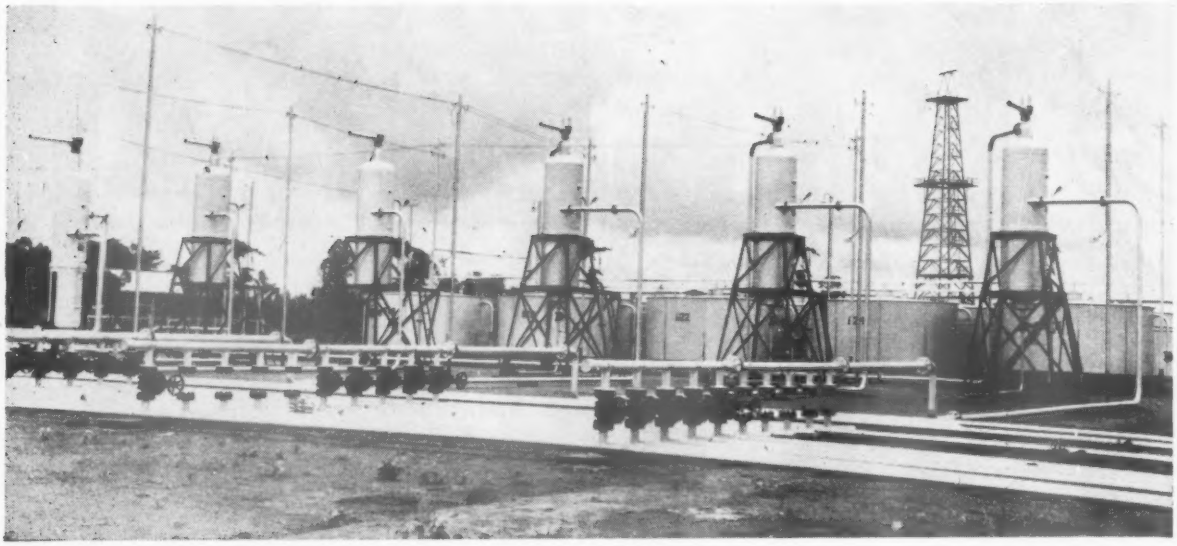
WAREHOUSE STOCK POINTS:

Texas: Alice, Alvin, Bay City, Beaumont, Borger, Bowie, Houston, Katy, Kermit, Lamesa, Odessa, Pampa, Pinehurst, Refugio, San Benito, Whiteface and Wichita Falls. *Louisiana:* Baton Rouge, Berwick, Donaldsonville, Ferriday, Harvey, Houma, Jennings, Lockport, Mansfield, New Iberia, Opelousas, Sulphur, Venice, and Ville Platte. *Oklahoma:* Apache, Ardmore, Cement, Guthrie, Healdton, Oklahoma City, Pauls Valley, Perry, Seminole and Shawnee. *Mississippi:* Brookhaven and Natchez.

MUD ENGINEERS LOCATED IN ACTIVE AREAS THROUGHOUT GULF COAST AND MID-CONTINENT

BARIUM

PLANT: Malvern, Arkansas — SALES OFFICE: Millie Esperson Bldg., Houston, Texas



The volume of oil obtained by the Japs in the Netherlands East Indies depends on their ability to replace installations like this one at Tjalang Djimar in southern Sumatra which were destroyed before the invasion

In the first part of this year Colombia's production was only a quarter of what it was in the same months of 1942 and only 15 per cent of the rate of February 1942. Colombia not only has a substantial excess ready for export but also a large potential still lacking outlets. Shell's Casabe field which has been partially developed has no outlet and, in addition, this company recently completed a promising wildcat in the Magdalena Valley which is of especial significance because of its promixity to tidewater. Developments on the Barco may result in increased production there after they have been defined.

Mexico Off One-Third

Mexico's production this year has been running approximately one-third lower than it did in early 1942 and could readily be expanded 50,000 bbl. daily without difficulty. Negotiations are still pending between this country and Mexico relative to the rehabilitation of its industry. This could be done only by using equipment manufactured in the United States and since there is a great need for all types of drilling and production equipment here, the advisability of exporting it is open to question. This condition also applies to the recently announced Petroleum Reserves Corp., one of the functions of which is the construction of facilities outside this country.

Latest reports on production in all three of these countries show that it is now on the uptrend. For example, Mexico's production in the first 4 months of 1943 was almost 18 per cent greater than in the same period of 1942 and Colombia's production, at the same time, had risen 50 per cent. While these appear to be substantial gains, the amount of oil they represent in terms of current demands on United States production is insignificant. The combined production of all three of these countries at their highest levels of the last 18 months would supply less than one-quarter of the demand now being met from this country.

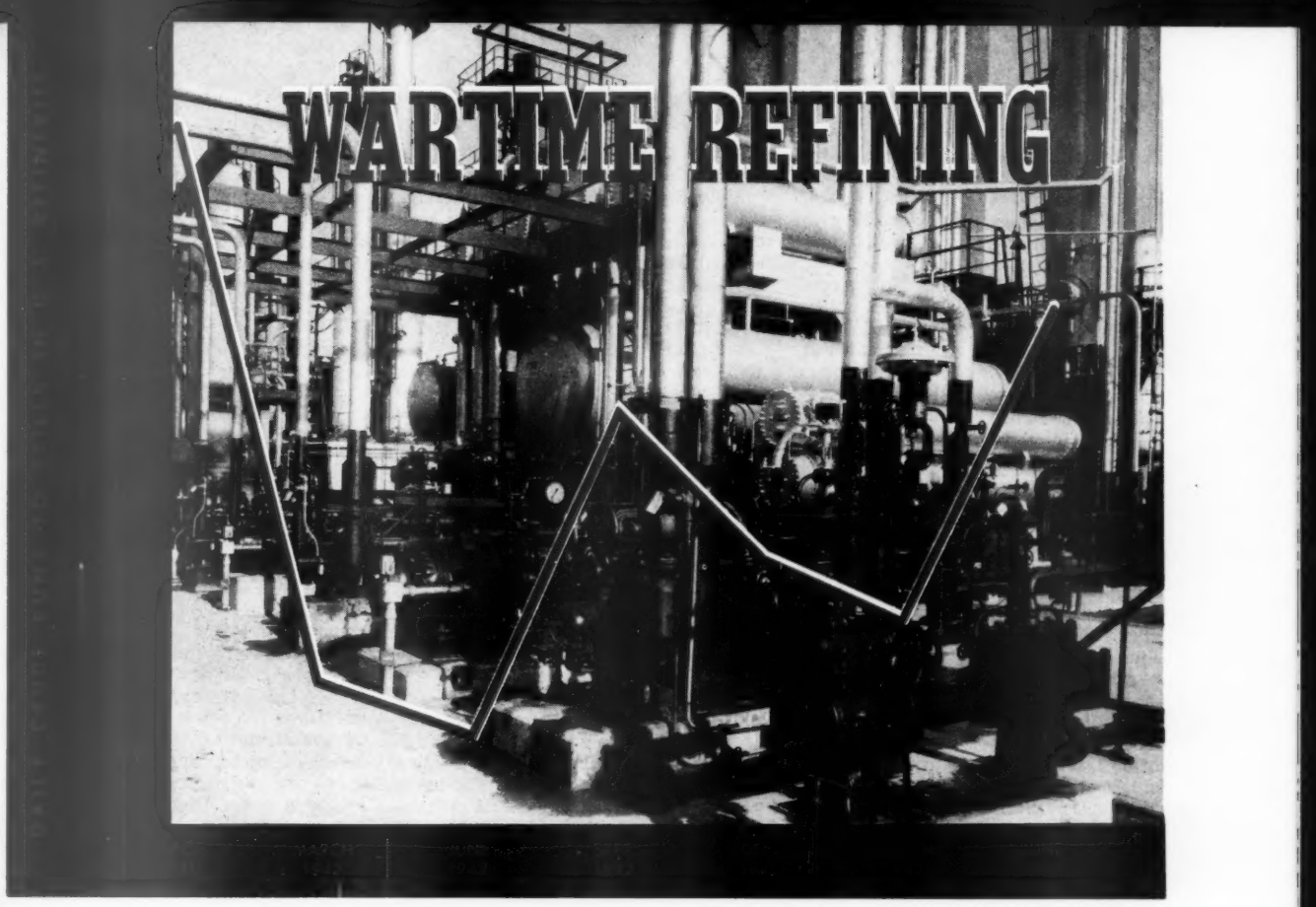
The Latin-American decline and the United States increase were the most prominent developments in the world-production picture in the comparison between the first half of 1943 and the corresponding period of 1942. European production is estimated to be somewhat lower than a year ago because of the temporary loss of fields in the western Caucasus by Russia. At the height of the Axis invasion, the Maikop fields were in control of the invaders and their most advanced armies in the Caucasus were on the edge of the Grozny fields. Until rehabilitation, including repair on pipe lines, was completed, the loss of the Maikop fields cost the U.S.S.R. 20,000 bbl. daily. Inability to use the pipeline system in the north Caucasus also undoubtedly curtailed Soviet production. This loss was offset to some degree by an increase in the Ural-Volga region, now up to an estimated 125,000 bbl. per day. U.S.S.R. production should come back in the last half of 1943 with the reconstruction of the Maikop area and development of new fields reported to have been discovered in the Azerbaijan area.

It is probable that Asiatic production increased in the first half of 1943 because of greater demands for near eastern oil and because of the opportunity Japan has had to restore production in the East Indies. Near eastern operations have been covered with a veil of secrecy because of their closeness to areas of warfare. The Far East is entirely in the control of the Japanese and they have undoubtedly exerted every effort to increase production in the Indies. It is likely that these efforts have been confined to Borneo which is closest to Japan and to Sumatra, most prolific of the far eastern producing areas. Effective destruction of properties and pipe lines has probably denied Japan any oil in Burma.

Italy's Facilities Attacked

The success of the United Nations' invasion of Sicily may be the forerunner of developments that will affect the Axis' position in Europe. Heavy bombing of the port of Bari on the Adriatic has reduced the value of Albanian oil to Italy since Bari is the principal port for importation of this oil and also the location of one of Italy's most valuable refineries. Much more significant are the possibilities that will be opened if Sicily is taken and southern Italy invaded. Bombers based in southern Italy would be within reach of Rumania, most important oil-producing area in Axis Europe, and Hungary, the one country in Europe where significant increases in oil production have taken place in recent years.

While the position of Rumania and Hungary is thus likely to become hazardous, the prospects for the other oil-producing regions throughout the world are improving. As a result it is almost certain that the improvement in world production inaugurated in the first half of 1943 will be accelerated in the last half with the possibility that by the end of the year it will reach a rate more nearly comparable to that of 1941 when it was at its all-time high.



WARTIME REFINING

by H. Stanley Norman

THE manufacturing end of the industry must increase its operations at least 5 per cent during remainder of the year in order to meet minimum essential demand for petroleum products. Crude oil charged to stills must average a minimum of 3,902,000 bbl. daily and indications are that even this substantially higher rate of operations may be inadequate to satisfy consumption essential to the war program.

Minimum runs to stills of 3,800,000 bbl. daily for 1943 were projected at the start of this year as the approximate rate of operations required to meet war demands. Nothing has happened since to modify that projected rate of essential operation. On the contrary, most earlier estimates of demand for war products have proven conservative. Calculated demand for aviation gasoline particularly has fallen short of the actual requirements. Consequently, some authorities now contend that crude-oil runs to stills in the remaining 5 months should be increased to 4,050,000 or 4,100,000 bbl. daily in order to satiate essential military demand and to prevent undue hardship among civilian consumers. Adequate petroleum to sustain the civilian-transportation network is only relatively less important in the war program than the fuels for combat planes, tanks, ships, trucks and other mechanized equipment.

Domestic refiners charged 668,935,000 bbl. of crude to stills during the first 6 months, a daily average of 3,695,775 bbl. This rate of operations was about 2 per cent, or 104,000 bbl. daily short of the minimum average for the year forecast by officials of the Petroleum Administration for War and oil-industry economists having access to the basic figures on requirements.

Deficiencies of the first 6 months plus whatever amount earlier estimates were short of current and near-future requirements must be made up in the second half. In the 2 weeks last reported by the American Petroleum Institute, crude runs to stills have averaged 3,905,000 and 3,952,000 bbl. daily, indicating that the manufacturing branch of the industry is definitely trending toward a higher operating level.

Special difficulty faces refiners and regulatory authorities alike in sustaining maximum use of domestic manufacturing facilities. Potential trouble is particularly acute in District 2, the highly important area between the Rocky and Appalachian mountains and north of Texas. Customarily, District 2 runs about 28 per cent of all crude oil charged to domestic stills. Refiners in District 2 were assigned a quota of 1,165,000 bbl. daily in June but preliminary A.P.I. data show that runs to stills that month averaged only 1,061,000 bbl. This month, the PAW refinery quotas assigned plants in District 2 aggregated 1,125,000 bbl. daily, but it is anticipated that about 168,000 bbl. per day either must be withdrawn from storage or imported from other districts where production exceeds manufacturing capacity.

While District 2 refiners were falling 104,000 bbl. per day short of their assigned quotas in June, the so-called

DAILY AVERAGE CRUDE RUNS TO STILLS
(Thousands of barrels)

	July 1943	Feb. 1942	July 1941
District 1	*660	712	750
District 2	*1,125	1,060	1,077
District 3	*1,410	1,392	1,416
District 4	105	84	101
District 5	720	532	565
	4,020	3,770	3,909

*Assigned PAW quotas.

PERCENTAGE DISTRIBUTION OF CRUDE RUNS TO STILLS

	July 1943	Feb. 1942	July 1941
District 1	16.5	18.9	19.2
District 2	28.1	28.1	27.6
District 3	35.1	36.7	36.2
District 4	2.6	2.2	2.6
District 5	17.7	14.1	14.4

censored area, which includes all of Districts 1 and 3, lifted daily average runs from 1,708,000 bbl. at the start to a peak of 1,899,000 bbl. during the latter part of the month, a swing upward of 191,000 bbl.

A moderate incline in the percentage of gasoline manufactured will be confirmed when full statistical reports are available on June and July operations. The national average of 35.3 per cent reported in April by the Bureau of Mines is the lowest level reached in the past 17 years. Not since 1926, when the national average of motor fuel manufactured was 34.9 per cent on crude charged, has the refining industry approached the low yield of gasoline prevailing in April. When this country entered the war, refiners were producing about 45.7 per cent gasoline from crude charged to stills. In June 1942, gasoline production was lowered to 37.8 per cent on crude. The further substantial decline in gasoline production, dipping from 37.2 per cent in December 1942, to a modern low point of 35.3 per cent last April was caused chiefly by PAW directives to District 2 refiners. Plants in District 2 were restricted to 70 per cent of their normal gasoline yield during April. "Normal" is defined as the average for the last half of 1941. The gasoline curb in District 2 was moderated in May to 85 per cent of normal and in June it was lifted to 90 per cent. All restrictions were removed in the July quotas to permit interior plants to produce sufficient motor fuel to satisfy increasing agricultural demand. Many operators anticipate that restrictions on gasoline production will be tightened after fall harvesting is completed in order to increase the volume of fuel-oil production.

Radical Change in Yields

The chart accompanying this discussion indicates the influence of gasoline production on the volume of fuel oil. For example, when gasoline amounted to 45.7 per cent of the crude charged, combined yields of distillate and residual fuel oils were 38.6 per cent. In contrast, the depression of gasoline production to 35.3 per cent on crude was accompanied by a rise to 45.4 per cent in fuel-oil output.

An increase of nearly 5 per cent in the classification "other products and losses" is a partial reflection of the rising output of aviation gasoline. Actual losses in refinery operations are at the lowest level in history. There is no direct relation, however, between the higher percentage of "other products" and aviation gasoline because substantial quantities of base stock come from what normally is considered automotive gasoline.

Much the larger of the two special war assignments given the refining industry is the production of an undisclosed volume of aviation gasoline. Military authorities have declined to reveal the current production and projected goal. Five or six successive revisions, each aimed at greater production, have occurred since the war started. The present program probably falls between 10 and 12.5 per cent of the total domestic production. Part of the upward revisions have been made necessary by a substantially lower number of plane losses than was anticipated when original military plans were drawn.

Rubber Program

The next largest war project assigned chiefly to the petroleum industry was the production of butadiene for the synthetic-rubber program. Fourteen butadiene units at 10 refineries in Texas, Louisiana and Arkansas, combined, represent the major portion of the program. They have rated capacity of 386,700 short tons of rubber. Adjacent to, and frequently operated in conjunction with southwestern petroleum refineries, are plants for production of enough styrene for 378,700 tons of rubber.

There are 84 separate units in 48 plants composing the national program for synthetic rubber. About 65 per cent of the projected production of 735,000 tons of synthetic rubber will be manufactured from petroleum hydrocarbons. All plants are scheduled to be in operation by end of the year. Two Texas and one Louisiana plants with combined capacity of more than 95,000 tons of butadiene were placed in operation last month and the others are either in operation or advanced stages of construction.

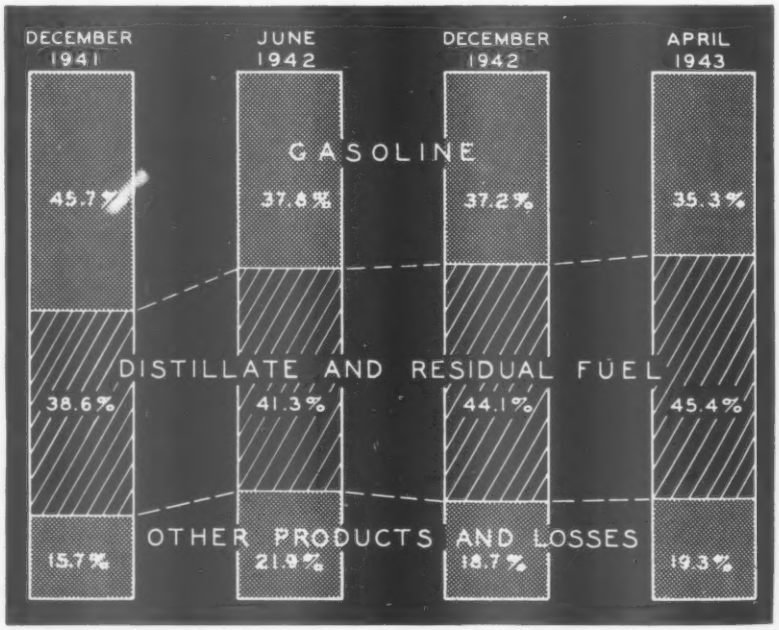
Probably less is known about capacities of toluene facilities built and operated by petroleum refiners than any other single phase of the oil industry's wartime operations. Plants are in operation or under construction on the Gulf Coast, in the Great Lakes area, on the Pacific Coast and recently the first such plant in the East Coast area started production. Manufacture of toluene is a comparatively minor task and requires relatively little equipment in contrast to the aviation-gasoline and synthetic-rubber programs.

After a year of trimming so-called "fat" from the inventories of the petroleum industry, refiners now are at approximate minimum working levels on most products. Motor-fuel stocks currently are nearly 10 million barrels less than a year ago, residual-fuel inventories are down 10.5 million barrels and crude oil aboveground is about 10.5 million barrels less than it was a year ago. Weekly data on stocks of the principal products are published in each issue of the Journal on the Trends page. Current inventories of motor fuel and crude are considerably below desirable working levels in some areas. Gasoline stocks are particularly short on the East Coast and in the Middle West.

STOCKS OF PRINCIPAL OILS
(Thousands of barrels)

	July 1, 1943	January 1, 1943	July 1, 1942
Motor fuel*	78,316	84,420	87,014
Distillate fuel*	34,380	42,913	33,520
Residual fuel*	66,470	78,881	76,903
Crude oil†	240,927	234,354	251,421
All oils†	‡492,380	497,405	515,132

*A.P.I. estimate. †Bureau of Mines figures. ‡May 1, 1943.



Charted decline of gasoline production against rises in fuel oil

This unit governs the differential of 16 rate-of-flow controllers

Engineers at the "Controls."!

◗ Unflagging efforts of the petroleum industry's engineers, during the past few years, have been toward greater efficiency of operations and lower operating costs.

◗ The checks and controls set up have called for the greatly increased use of metering. And this, in turn, has promoted conservation of petroleum products, simplification of operations, and lower investments due to streamlining operation—decreasing the use of tankage and other equipment.

◗ Note how well these achievements dovetail with today's national needs and urgencies.

◗ American Meter Company's experience as measurement engineers, applied in the petroleum industry since its beginning, has enabled the company to make modern contributions of very practical value.

◗ One is the Air-Actuated Remote Recorder and Controller . . . a rugged yet sensitive device for the recording and control of pressures, rates of flow, and liquid levels—over any distance. It has helped many an operator perfect the desired well-coordinated system of centralized control. This Metric-American instrument is described in Bulletin E-22, obtainable upon request.

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Recording liquid level by long-distance transmission

First Half of 1943 Marked by Great Pipe-Line Achievements

by Paul Reed

WHAT has been accomplished in pipe-line construction in the first half of 1943 was almost unthinkable 3 years ago. The year started off with the completion of War Emergency Pipelines, Inc.'s 24-in. crude oil line from Longview, Tex., to Norris City, Ill., and within the next few weeks all of the projects beginning in 1942 were finished which had been fostered by the original national program for increasing the flow of petroleum supplies to the East Coast. At midyear the WEP 24-in. line is being prepared for moving crude oil to the New York and Philadelphia refining centers. Because of the urgent need for sending large amounts of petroleum eastward by overland routes, the whole pipe-line situation has been dominated by the crude-oil and refined-products transportation activities.

Although the natural-gas industry has had to stand aside while the steel needs of petroleum lines have been served, a beginning was made this spring for starting several large natural-gas projects. This trend is continuing and much natural-gas pipeline construction activity is in prospect for the future.

So far, 1943 is distinctly a big-inch year. Major projects, including the 24 and 20-in. lines of WEP, the 16-in. line planned by Stanolind Pipe Line Co., the looping and expansion programs of Panhandle Eastern Pipe Line Co., East Ohio Gas Co. and Cities Service Gas Co., involving the use of pipe of 20-in., 24-in. and 26-in. diameters, represent a total of nearly 3,800 miles. The program is considerably greater than the mileage of smaller pipe normally laid in the same period. In normal years, most pipe laid would be 12-in. and less in diameter. By the end of the year, possibly a total of 6,000 miles of pipe of all sizes will have been laid for crude oil, refined products and natural-gas service.

Pipe-Line Movement Rises

The volume of crude oil and refined products handled by the principal pipe lines since Pearl Harbor has steadily increased. During the same period, earnings have lagged, according to the Interstate Commerce Commission, which reports that the 1942 traffic increased 7.37 per cent over 1941 while transportation revenues decreased 2.8 per cent. During the first quarter of 1943, volume handled increased 10 per cent over the corresponding period of the previous year. The 43 principal pipe-line companies reported revenue for this period increased 9.2 per cent.

Attention in 1943 has centered on accomplishments of WEP. The great capacity of the Longview-Norris City leg of the 24-in. crude oil, estimated at a minimum of 325,000 bbl. has not been yet fully utilized because of difficulty in arranging for sufficient crude and tank cars for the eastward movement. The last 45 days, capacity of the line has been restricted by inundation of pumping equipment during the severe floods this summer. One of the sensations of the year was the speed with which a temporary 20-in. line was laid across the Arkansas River immediately after flood waters broke the main 24-in. line. By filling the recently constructed eastern extension of the line at the rate of 100,000 bbl. daily, beginning in the latter half of July, oil going eastward from the Norris City, Ill., terminal will finally reach the end of this 1,400-mile system late in August.

The 20-in. refined products line from the Houston-Beaumont area will probably be completed to Norris City by September 1 so as to utilize terminal facilities there for tank-car shipments until the 235,000-bbl. system is finished to the New York-Philadelphia area about December 1. The WEP 20 and 24-in. systems represent a total of more than 3,000 miles of new line. In spite of unusually bad weather, objectives have been reached nearly on schedule.

The first Gulf Coast-East Coast system to be put in operation was a group of lines designated as Project 2 in the national pipe-line program. With the completion of the 275-mile 8 and 10-in. lines of Bayou Pipe Line System and laying of the 179-mile 8-in. extension to Richmond, Va., Plantation Pipe Line Co. is in a position to receive about 60,000 bbl. of products daily at Baton Rouge from the Houston-Beaumont area and deliver 30,000 bbl. daily in the Potomac area.

After many difficulties which prevented the Trans-Florida Pipe Line Co. from making deliveries of refined products on the Atlantic Coast until late in April, although pumping started in January, the line finally became a 200-mile 8-in. line for expediting

Portable rigs lined up at a river crossing, drilling shot holes for blasting a trench

barge movements to serve southern states.

Extensive work must be done on the Southwest Emergency Pipe Lines system, financed by DPC, in order to put it in service for moving sweet crude from the Corpus Christi area to Houston, Tex., through a line which consists largely of 58 miles of 14-in. and 92 miles of 16-in. pipe acquired from a natural-gas company. This line is intended to move 75,000 bbl. daily.

In October, construction is to start on the 383-mile 16-in. crude-oil line of Stanolind Pipe Line Co. from West Texas to Drumright, Okla., which promises to be a major factor in the affairs of District 2 refineries since it will have an initial capacity of 54,000 bbl. daily when it is completed in March 1944 with only one pump station.

Construction has been started on 200 miles of 8-in. refined-products line with 30,000 bbl. daily capacity from East Chicago to Toledo, Ohio. Consideration has been given in the first half of 1943 to a proposal to build a 165-mile 10-in. line from Albany, N. Y., to Boston Mass., for moving fuel oil.

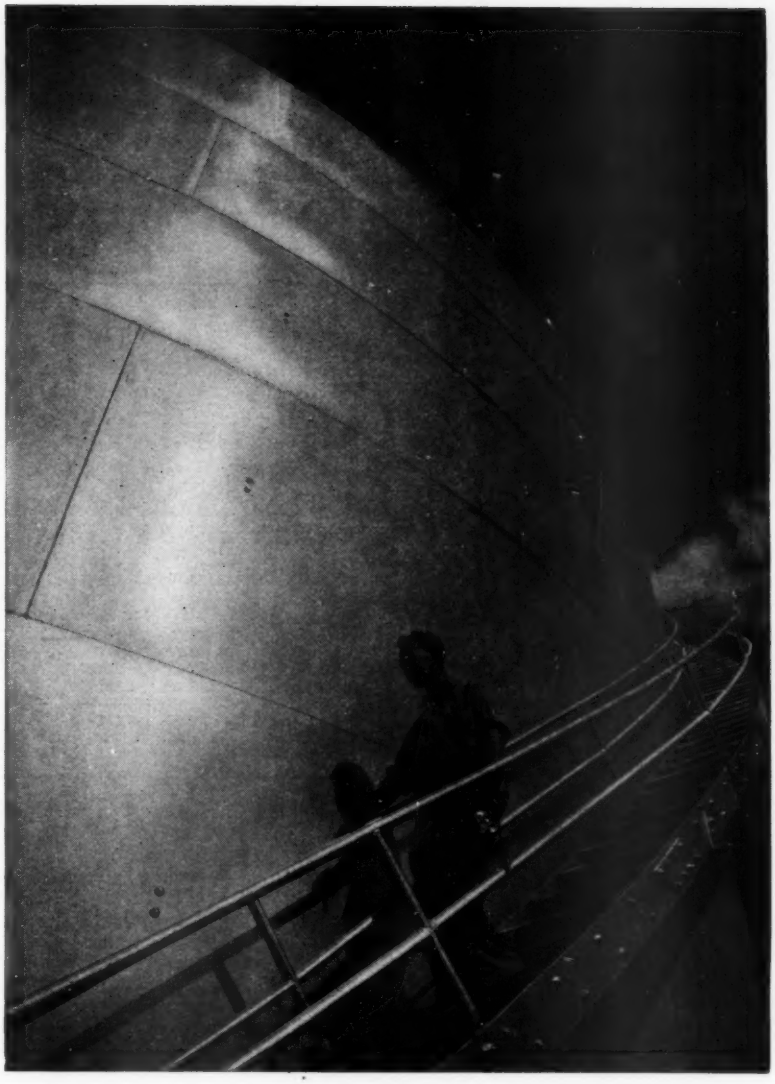
The first big natural gas pipe-line construction to get under way this year was for the program of extending the East Ohio Gas Co. system westward by a 120-mile 20-in. line from Brecksville, in the vicinity of Cleveland, to Maumee, Ohio, near Toledo. This extension will receive 50,000,000 to 100,000,000 cu. ft. daily from Panhandle Eastern Pipe Line Co., which is enlarging capacity of its line from the Texas Panhandle by the construction of 238 miles of 24-in. and 26-in. loops.

For more than a year much attention has been given to proposals to pipe gas from southern Louisiana gas fields to Tennessee and West Virginia points. Recently interest has shifted to the Hugoton field in southern Kansas.

First to arrange for building a new outlet from Hugoton is Cities Service Transportation & Chemical Co. which is due to commence work on a 240-mile 26-in. line to Blackwell, Okla., early in October.

Of much significance this month is the proposal of Hope Natural Gas Co. to build a 1,140-mile 22-in. line from the Hugoton field to West Virginia to transmit 240,000,000 cu. ft. daily. Estimated cost is $50,904,711.

After a long series of hearings Federal Power Commission announced on July 7, 1943, that it would issue a certificate of convenience and necessity to Tennessee Gas & Transmission Co. for a Louisiana-Kentucky line provided that the company could show at a hearing, set for September 7, its ability to finance the line, obtain gas and authorization from WPB for pipe and other material.



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Natural Gas Setting Record

by I. P. O'Donnell

ON the basis of currently available indications, sales of natural gas in 1943 will not only set a new high record but will probably come close to being twice the volume sold in 1929, thus doubling the size of the industry in a period of 15 years. Data available for the first part of this year show that sales are running approximately 10 per cent above the level of a year ago. If this rate is continued during the remainder of the year, total natural-gas sales in 1943 will reach 1,945,785,000,000 cu. ft., which would compare with total sales of 993,017,000,000 cu. ft. in 1929.

Growth of the natural-gas industry has been particularly phenomenal in the 5-year period, 1939-43, inclusive. In that period sales rose almost three-quarters of a billion cubic feet to a point 60 per cent above the 1938 total. The rapid growth of the industry in these 5 years is shown in the following table which compares actual sales in 1938 with those of 1943 estimated on the basis of available data (in millions of cubic feet):

	1938	1943
Domestic	352.837	495.000
Commercial	100.915	160.000
Industrial	744.001	1,250.000
Miscellaneous	15.164	40.000
Total	1,212,917	1,945,000

Volumewise, the greatest increase during this period was in industrial sales which rose 500,000,000,000 cu. ft. and in doing so accounted for approximately 70 per cent of the increase for the industry as a whole. Therefore, since the bulk of the revenue obtained by the industry is derived from domestic sales, revenues will not show a corresponding increase. Whereas the gross revenue in 1938 from the sale of 1,212,917,000,000 cu. ft., was $418,125,000, rising only to $583,025,400 in 1942 for the sale of 1,768,894,000,000 cu. ft. of gas. While total sales rose about 46 per cent, revenue increased less than 40 per cent.

TABLE 1—First Quarter Statistics

Customers—	1943	1942	Per cent change
Domestic*	7,891,600	7,645,100	+3.2
Commercial	549,500	567,400	—3.2
Industrial†	54,400	53,600	+1.5
Miscellaneous	2,200	2,600	...
Total	8,497,700	8,268,700	+2.8
Sales (thou. of cu. ft.):			
Domestic*	201,409,700	192,326,700	+4.7
Commercial	62,781,300	58,675,600	+7.0
Industrial†	303,541,400	266,265,800	+14.0
Miscellaneous	10,981,000	8,978,800	...
Total	578,713,400	526,246,900	+10.0
Revenue (dollars):			
Domestic*	122,645,200	118,273,500	+3.7
Commercial	24,998,000	24,371,200	+2.6
Industrial†	57,384,400	50,049,200	+14.7
Miscellaneous	1,651,200	1,437,500	...
Total	206,678,800	194,131,400	+6.5

*Includes house heating. †Includes electric generation.

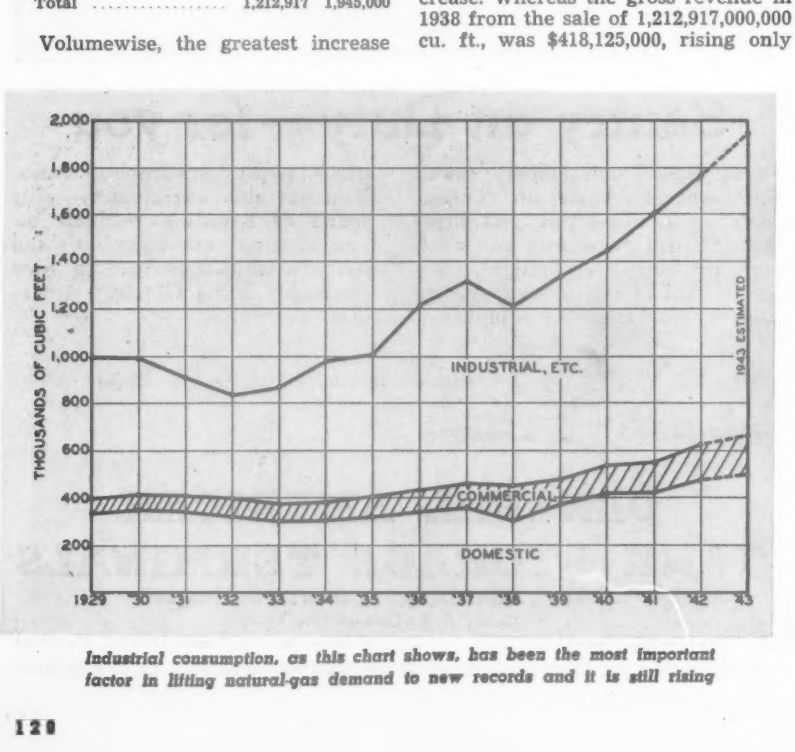
Growth of the industry since 1929 is illustrated in the accompanying graph which shows sales by the major divisions from that year through 1943. These data show that the average annual increase in sales over the past 5 years is 145,000,000,000 cu. ft. Table 1 compares the industry's record for the first quarter of this year with the corresponding 1942 period. All statistics, except the estimates, were supplied by the statistical department of the American Gas Association, New York.

Transportation Limits Growth

While the growth of the natural-gas industry in recent years has been very great, it would have been even greater had it been possible to increase transmission capacity in line with increasing demand. Reserves are estimated at some 170 trillion cubic feet which, at the current rate of consumption, is equivalent to well over half a century's supply. Existing transmission facilities are capable of handling only a small fraction of this potential. Few lines, except those required to aid in the prosecution of the war production program, will be installed until steel becomes available. Therefore, further growth for the industry will be regulated by the capacity of existing lines and additions made to supply war demands.

Drilling for gas was sharply curtailed in the first half of this year and, in view of the large known reserves, will probably remain curtailed for the duration with the exception of those areas where shortages may exist. Gas well completions in the first half of this year approximated 800 which compares with slightly less than 1,000 in the same months of 1942, a decline of 20 per cent. Even the eastern fields, which supply the shortage area of western Pennsylvania and eastern Ohio, registered a marked decline of 18 per cent. The latter decline may have been to some extent a result of a decrease in drillable locations.

Continued progress in the utilization field was apparent in the first half of the year from statistics on sales. That further progress is in store for the industry in this field is likewise apparent. At the same time these new uses may be increasingly profitable.



Industrial consumption, as this chart shows, has been the most important factor in lifting natural-gas demand to new records and it is still rising

Drilling Decline Continues With Few Prospective Active Areas

by W. V. Howard

Exclusive of service wells, there were 7,819 completions reported in the United States during the first half of 1943, a decline from the first half of 1942 of 1,575 wells. Prospects are that the decline will continue through 1943.

DRILLING continued at a very low level in the first half of 1943, being approximately 20 per cent less than in the first half of 1942. Of the 7,819 wells completed, 3,283, or more than 40 per cent, were drilled east of the Mississippi River. These completions were made up of 1,791 oil wells, 637 gas wells and 855 dry holes. With the exception of Mississippi and Michigan, production from these wells is expected to be small so that it may be said that about 40 per cent of the nation's present drilling activity is concentrated in an area from which no large addition to reserves is anticipated.

In this eastern area, in which over 40 per cent of the producing wells were drilled, 1,000 producers were in the Appalachian states, mostly in the Bradford field. In addition to these producers, approximately 900 input wells were also drilled. These are not included in the totals. The eastern districts also provided more than 75 per cent of the nation's gas wells, the great majority having less than 500,000 cu. ft. daily capacity. A little less than one-third of the dry holes were also drilled in this area.

In the remainder of the country, from which the great bulk of domestic production is obtained, there was a pronounced falling off in drilling activity and most of what there was was in older fields.

Omitting the eastern states, including Indiana and Kentucky, there was a total of 5,645 completions, of which 1,430 were wildcats. These 1,430 wildcat wells were responsible for the discovery of 181 new pools, extensions or new sands and 31 new gas pays, a total of 212, or 15 per cent. The area with the best record of successes was the Louisiana Gulf Coast district with 15 discoveries out of 32 attempts. The largest number of discoveries, 65, was recorded by Texas, but of these 46 were in the north central and southwestern districts where small fields have been the rule in recent years. Kansas stood second with 35 discoveries, of which probably the majority will turn out to be extensions to older fields. The record, as shown in Table 1, does not differ greatly from that of previous years in the number of discoveries.

Table 2 shows the record of the development drilling in the different areas. This table is significant in that it shows a total of about 25 per cent dry holes, many of which were drilled in barren spots within producing areas although the majority were marginal wells. It may be considered that those areas in which the proportion of dry holes to producers is high have relatively little additional acreage to be drilled up. Some districts, such as Michigan, North Central Texas, Southwest Texas, and Louisiana, show a disproportionately large number of dry holes. On the other hand, in West Texas and California less than 10 per cent of the development wells drilled were dry. In West Texas, this was due primarily to

(Continued on Page 135)

Summary of Completed Wells

	Oil	Gas	Dry	Total	Aver. footage	Total Jan.-June 1942
Eastern	1,000	325	84	1,409	2,004	1,824
Ohio	54	201	146	401	2,585	469
Indiana	43	7	57	107	1,679	207
Kentucky	104	81	75	260	2,364	162
Michigan	96	13	137	246	1,977	333
Illinois	485	10	323	818	2,400	833
Mississippi	8	0	33	41	5,611	37
Alabama	1	0	0	1	1,856	2
Kansas	393	9	366	768	3,384	724
Nebraska	1	0	8	9	3,112	17
Missouri, Iowa	0	0	5	5	914	9
Oklahoma	242	45	248	535	2,886	628
Texas	965	70	821	1,856	4,201	2,905
N. Central	226	12	356	594	2,767	656
East	68	6	68	142	4,815	199
West	320	4	77	401	4,557	815
Panhandle	70	23	12	105	2,778	200
Southwest	183	17	218	418	4,209	631
Gulf Coast	98	8	90	196	6,579	404
Louisiana	153	24	144	321	7,327	509
Gulf	93	6	71	170	9,289	270
North	60	18	73	151	4,264	239
Arkansas	70	2	47	119	4,963	78
Montana	61	18	19	98	2,132	84
Wyoming	42	1	12	55	3,975	47
Colorado, Utah	3	0	4	7	2,945	5
New Mexico	74	6	25	105	2,866	139
California	525	14	119	658	3,265	380
Total: 1943	4,320	826	2,673	7,819	3,248	9,394
1942	5,628	997	2,769	9,394	3,226	....
Difference	1,308	171	96	1,575	....	....
Total: 1941	*9,724	1,251	3,278	*14,253		
1940	*11,000	920	3,117	*15,037		
1939	*8,609	866	2,992	*12,467		
1938	*9,721	958	2,855	*13,536		

*Includes input wells in eastern fields.

The Failing 66

50,000 LBS. VS. 250,000 LBS.

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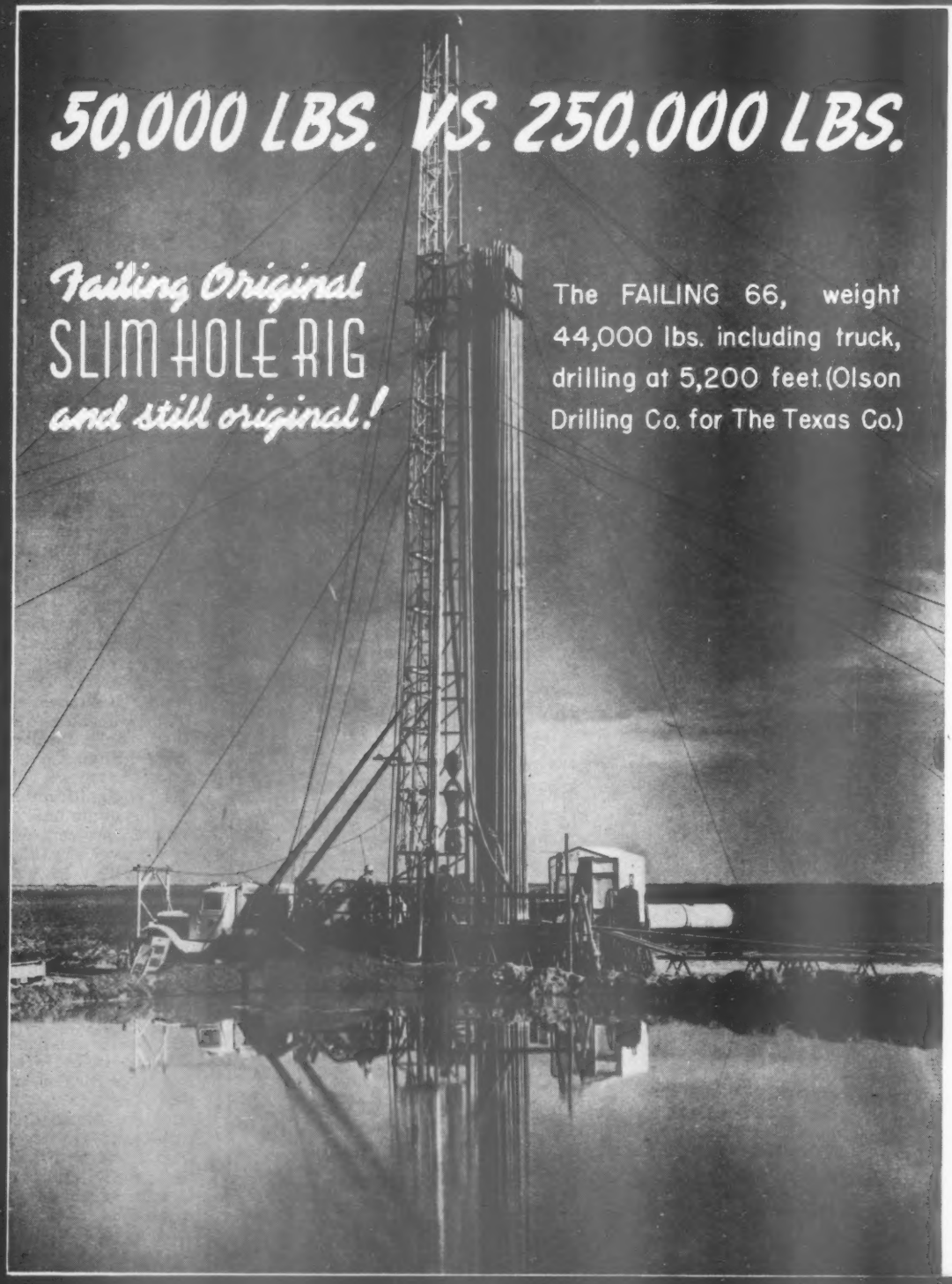


The FAILING 66, weight 44,000 lbs. including truck, drilling at 5,200 feet. (Olson Drilling Co. for The Texas Co.)

Geo. E. Failing

ENID, OKLAHOMA

TABLE 1

Wildcat Completions First 6 Months 1943

	Total	Oil	Gas	Dry
Michigan	33	4	0	29
Illinois	221	22	2	197
Mississippi and SE	34	2	0	32
Kansas	217	35	0	182
Forest City Basin	13	0	0	13
Oklahoma	163	25	10	128
Texas	524	65	10	449
North Central	175	23	1	151
East	62	4	1	57
West	50	1	1	43
Panhandle	3	0	0	3
Southwest	167	23	1	143
Gulf	67	9	6	52
Louisiana	76	17	3	56
North	44	3	2	39
Gulf	32	14	1	17
Arkansas	32	1	0	31
Montana	7	2	0	5
Wyoming	15	6	0	9
Colorado	2	0	0	2
New Mexico	16	0	2	14
California	77	2	4	71
Total	1,430	181	31	1,218

TABLE 2

Development Wells First 6 Months 1943

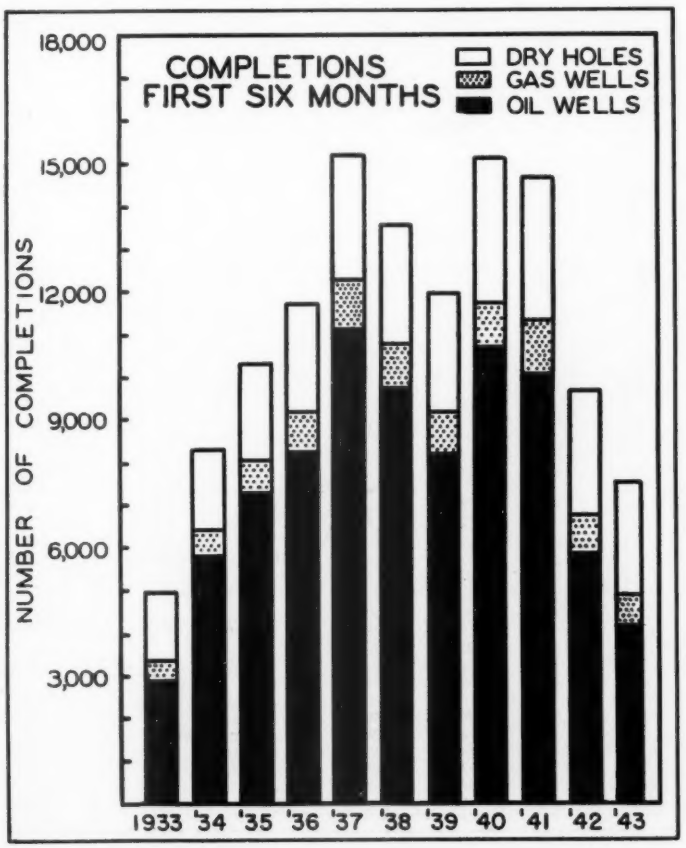
	Total	Oil	Gas	Dry
Michigan	217	92	13	112
Illinois	597	463	8	126
Mississippi and SE	7	6	0	1
Kansas	551	358	9	184
Forest City Basin	1	1	0	0
Oklahoma	372	217	35	120
Texas	1,332	900	60	372
North Central	439	223	11	205
East	78	64	5	9
West	351	314	3	34
Panhandle	105	70	23	12
Southwest	251	160	16	75
Gulf	129	89	2	38
Louisiana	245	136	21	88
North	107	57	16	34
Gulf	138	79	5	54
Arkansas	87	69	2	16
Montana	91	59	18	14
Wyoming	40	36	1	3
Colorado	5	3	0	2
New Mexico	89	74	4	11
California	581	523	10	48
Total	4,215	2,937	181	1,097

the continued drilling of Slaughter and Wasson, with a total of 135 oil wells out of 139 completions.

In California, the story is very different. Out of the 581 wells drilled in and around producing areas, 110 were completed in the Midway-Sunset, Buena Vista Hills area for 96 producers. South Belridge had 75 producers out of a total of 77; in Coalinga there were 70 wells drilled, of which 69 were oil wells. Kern Front had a perfect record of 64 oil wells out of 64 drilled. Thus, these four old heavy-oil fields accounted for a total of nearly 60 per cent of California's field wells. If the demand for heavy oil continues, this activity may spread into still other fields.

In Kansas, there are two areas which are developing rapidly and in which there is room for still more drilling. These are the Carmi and Lindsborg fields. These new fields are of particular interest in that they lie outside the main producing belt on the Central Kansas uplift, Lindsborg to the northeast and Carmi to the southwest. Elsewhere in Kansas, drilling continues as it has during the past few years in expanding and linking older producing areas. The six old fields which have seen the most extensive development in 1943 are Hall - Gurney, Kraft-Prusa, Zenith - Peace Creek, Chase, Silica and Trapp. With the exception of the Zenith-Peace Creek trend, these fields are in the heart of the old producing belt which appears more than ever to be merging into a single enormous accumulation.

In Oklahoma, two fields, Cumberland and Velma, have seen considerable activity. Of these, Cumberland is being operated by a single company and is a comparatively new field under orderly development. Velma, on the other hand, is an old field in which a number of blank spots were left in the early days.



Oregon Basin, Cut Bank and Kevin Sunburst accounted for nearly three-quarters of the development drilling in the Rocky Mountain area. Of these, Kevin-Sunburst is the most nearly drilled up but there are a number of locations made available by the recent PAW order permitting 10-acre spacing. Cut Bank lies on a buried shore line and there is an active search for a continuation of production as well as some development drilling within the field. This drilling will also continue through the year. Oregon Basin is the first of the black-oil fields of Wyoming to see activity in recent years and the end of the drilling here is also not in sight. It may, however, be far overshadowed by the activity at Elk Basin, whose Tensleep sand promises to be one of the leading discoveries of recent years.

Outside of West Texas, the only sector of Texas which seems likely to see a great deal of activity is East Texas. Hawkins is pretty well drilled up at the present time, but Kildare and Quitman are both important discoveries in which there is much development to be done.

After several years of activity, the Eddy County pools of New Mexico are slowing down a little although this is still the most active section in the state with Grayburg-Jackson, Maljamar and Square Lake responsible for three-quarters of the development wells drilled.

Eastern Area

A great part of the drilling in Illinois took place in fields discovered during the past year and a half although the older fields, such as Louden, Salem and Clay City added a few wells. In view of the decreasing size of the discoveries, it is probable that drilling in Illinois will decline during the second half year, as the effect of PAW's loosening of spacing requirements will soon be lost owing to the number of wells completed. Kentucky and Ohio have each seen relatively important discoveries which promise to maintain high rates of drilling. Added to these discoveries is the effect of the strong demand for gas. It is believed that drilling in the Appalachian area will slowly decline as the waterflooding projects at Bradford near completion.

Ellenburger Discoveries in Winkler County Are of Major Importance

by Harry F. Simons

TWO new Ellenburger discoveries plus another which was completed successfully after midyear opened up the entire west side of the Permian basin for Ordovician exploration. All three of the discovery wells were in Winkler County and two of them were within 4 miles of each other although on separate structures. The third well, which was in the process of completion as the midyear ended, was 14 miles southeast of the others.

Continued drilling in the Embar-Ellenburger pool in Andrews County and the Barnhart pool in Reagan County gave further encouragement to Ordovician development in the entire area. The Embar-Ellenburger pool doubled in size and at the end of June had 14 wells. The Barnhart pool added 10 new oil wells and 1 dry hole to justify being described as a major pool.

The search for Ordovician oil has spread throughout the entire southern half of the Permian basin instead of being restricted to a comparatively small area on the southern end as it was up until the present year. So far there has been comparatively little Ordovician prospecting in the northern sector.

PRODUCTION—WEST TEXAS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Barnhart	89	50	19	5
Big Lake district	1,303	1,351	300	286
Big Lake	*910*	*1,003*	*199*	*200*
World	*343*	*295*	*82*	*66*
Miscellaneous	*50*	*53*	*19*	*20*
Cedar Lake	156	154	51	43
Cowden-Foster	2,271	4,452	1,418	1,416
Cowden, North	*976*	*1,984*	*533*	*533*
Cowden, South	*239*	*397*	*117*	*115*
Emma	*89*	*184*	*67*	*64*
Foster	*749*	*1,444*	*576*	*579*
Johnson	*218*	*443*	*125*	*125*
Fuhrman district	112	207	105	70
Fuhrman	*75*	*155*	*55*	*55*
Miscellaneous	*37*	*52*	*50*	*15*
Fullerton	84	113	16	4
Goldsmith-Harper	3,696	4,713	1,182	1,170
Goldsmith	*3,213*	*3,547*	*948*	*963*
Harper	*214*	*279*	*184*	*184*
Embar	*205*	*12*	*19*	*1*
Miscellaneous	*64*	*31*	*31*	*17*
Hendrick-Keystone	4,101	4,339	1,756	1,921
Eaves	*87*	*78*	*8*	*7*
Emperor	*264*	*247*	*121*	*116*
Halley	*65*	*44*	*25*	*25*
Henderson	*742*	*388*	*140*	*133*
Hendrick	*1,080*	*1,282*	*276*	*300*
Kermit	*655*	*1,038*	*714*	*832*
Keystone	*830*	*911*	*379*	*356*
Leck	*55*	*94*	*9*	*9*
Scarborough	*230*	*221*	*60*	*130*
Weiner	*93*	*35*	*24*	*8*
Howard-Glasscock	2,374	2,401	823	824
Iatan-Snyder	804	873	416	401
Iatan	*688*	*726*	*316*	*303*
Snyder	*116*	*147*	*100*	*98*
Jordan-Waddell	1,392	1,492	508	506
Dune	*62*	*63*	*26*	*25*
Jordan	*626*	*613*	*222*	*225*
Penwell	*375*	*540*	*169*	*171*
Waddell	*316*	*254*	*85*	*81*
Miscellaneous	*13*	*17*	*6*	*6*
McCamey district	1,659	1,502	960	965
Crane-Cowden	*77*	*101*	*99*	*100*
McCamey	*1,567*	*1,387*	*845*	*849*
Miscellaneous	*15*	*14*	*16*	*16*
McElroy	2,523	2,305	595	589
Means	229	478	75	121
Pecos Valley district	1,083	1,057	657	610
Abell	*382*	*380*	*105*	*85*
Apco	*105*	*52*	*28*	*18*
Lehn	*37*	*56*	*49*	*40*
Payton	*154*	*158*	*117*	*128*
Pecos Valley	*125*	*160*	*167*	*178*
Shearer	*84*	*85*	*43*	*46*
Walker	*146*	*113*	*69*	*50*
Miscellaneous	*50*	*43*	*79*	*59*
Sand Hills	746	698	163	164
Seminole	839	950	293	288
Sharon Ridge	181	211	175	186
Slaughter-Dean	4,128	3,968	1,331	1,084
Taylor-Link	304	316	128	116
Ward, North	1,233	1,287	507	496
Magnolia-Sealy	*102*	*113*	*53*	*53*
Magnolia-Sealy, South	*113*	*68*	*21*	*15*
North Ward	*991*	*1,090*	*423*	*422*
Spencer	*27*	*16*	*10*	*6*
Ward, South	1,355	1,488	1,026	1,039
Estes	*641*	*782*	*340*	*345*
Monahans	*41*	.....	*2*	..
Shipley	*223*	*220*	*128*	*123*
South Ward	*450*	*485*	*556*	*571*
Wasson	4,614	5,296	1,425	1,359
Wasson	*4,573*	*5,264*	*1,413*	*1,346*
Miscellaneous	*41*	*32*	*12*	*8*
Westbrook	105	111	87	87
Wheat	105	172	86	85
Yates district	4,076	3,319	920	916
Crockett	*43*	*42*	*37*	*37*
Noelke	*40*	*53*	*35*	*25*
Tobarg	*239*	*238*	*254*	*254*
White and Baker	*52*	*39*	*26*	*18*
Yates	*3,702*	*3,040*	*568*	*582*
Miscellaneous pools	92	144	65	57
Total West Texas	39,654	42,528	15,087	14,755
TEXAS PANHANDLE				
Carson County	2,290	2,300	723	692
Gray County	7,499	6,644	2,401	2,377
Hutchinson County	5,747	5,799	2,066	1,964
Moore County	74	90	15	15
Wheeler County	694	660	413	413
Total	16,304	15,493	5,618	5,461

PRODUCTION—NEW MEXICO

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Artesia-Red Lake	138	173	238	238
Artesia	*98*	*106*	*172*	*174*
Red Lake	*40*	*67*	*46*	*64*
Cooper-Lynn	825	627	180	176
Cooper	*399*	*375*	*85*	*88*
Eaves	*147*	*111*	*24*	*23*
Jal	*70*	*51*	*19*	*19*
Lynn	*129*	*132*	*33*	*30*
Rhodes	*80*	*58*	*19*	*16*
Eunice-Monument	7,509	6,166	1,169	1,172
Arrowhead	*750*	*554*	*111*	*105*
Eunice	*3,025*	*2,550*	*484*	*493*
Monument	*3,308*	*2,741*	*493*	*499*
South Eunice	*426*	*321*	*81*	*75*
Getty-Barber	143	158	24	23
Grayburg-Loco Hills	1,805	1,620	456	437
Grayburg-Jackson	*921*	*722*	*212*	*200*
Leonard	*108*	*127*	*33*	*50*
Loco Hills	*713*	*771*	*182*	*187*
Anderson	*63*	.....	*29*	...
Halfway	36	40	7	9
Hobbs	1,732	1,447	252	253
Lynch and West	65	50	12	12
Langlie-Mattix	853	1,005	274	281
Langlie	*461*	*508*	*119*	*125*
Mattix	*392*	*497*	*155*	*156*
Lusk, East and West	62	.....	9	.....
Maljamar and E and S	866	827	184	168
Penrose-Hardy	725	972	397	396
Hardy-Skaggs	*233*	*303*	*124*	*123*
Penrose	*327*	*459*	*191*	*191*
Skelly	*165*	*210*	*82*	*82*
Salt Lake	44	27	8	7
Shugart-Leo	105	101	30	39
South Lovington	274	220	42	41
Square Lake	497	55	106	28
Vacuum	2,218	1,588	344	344
West Eunice	127	66	19	18
Miscellaneous	52	62	28	33
Total S.E. New Mexico	18,076	15,204	4,053	3,675
Hospah	142	120	29	21
Miscellaneous N.W. New Mexico	65	84	68	71
Total New Mexico	18,283	15,408	3,779	3,767

The first wildcat to indicate Ellenburger production was the Amon G. Carter et al C-2 J. B. Walton, 7 miles northeast of Kermit in the Keystone field. Casing leaks delayed the completion of the well for several months. On June 19 an official test rated it at 6,789 bbl. in 24 hours through chokes. Gravity of the oil was 40.7° A.P.I. Top of the Ellenburger was 9,217 ft., oil pay was logged at 9,550 ft., and total depth was 9,655 ft.

The second discovery in the Ellenburger was the Magnolia 20 State-Walton, 5 miles north of Kermit in the Kermit field. The well flowed 601 bbl. of 41.7° oil per day natural through choke at 10,673 to 10,705 ft. Total depth of the well was 10,774 ft. with the top of the pay called at 10,640 ft. This well was 1,264 ft. lower on the top of the Ellenburger than the Carter well, which definitely indicates a separate structure and possible faulting.

There were two active operations in the Kermit-Ellenburger pool, both by Magnolia, at the end of the 6-month period. No aditional test had been staked in the Keystone-Ellenburger by July 1, but plans were under way to further outline the pool's possibilities.

The Stanolind 1 W. D. Blue in Winkler County, near the Ector County line, had penetrated the Ellenburger early in June, but the well was not completed officially until early in July. Top of the Ellenburger was 10,493 ft. or 1,452 ft. lower than the Carter-Walton well.

Two other Ordovician wildcats were drilling in the area, one in Andrews and one in Winkler County when the 6-month period ended.

A Clear Fork discovery on the east side of the Permian basin in northeast Howard County opened up the eastern side of the basin for deeper exploration. Most of the production in the area is from the San Andres lime. The well was the W. S. Guthrie and Cosden Petroleum 1 Pauline Allen, 9 miles northwest of the Westbrook pool. Initial production on pump was 162 bbl. of 27.3° gravity from pay at 4,040 to 4,096 ft. There are now two old wildcat dry holes being deepened to this pay, one in Mitchell and one in Borden County.

The five other discoveries in the Permian basin were relatively unimportant, the wells not being large and producing from pays already known to be productive.

In Gaines County, Shell Oil Co., Inc., 1 D. N. Leaverton, 5 miles southwest of the Wasson pool, pumped 213 bbl. 35.2° oil in 14 hours from 7,487 to 7,772 ft. in the Clear Fork lime. This well was completed early in February, but at the end of June there was only one attempt to extend the pool and it was in the process of completion.

The Slaughter pool in Hockley and Cochran counties continued to lead development in the area with the completion of 111 successful oil wells to increase its daily potential production 78,294 bbl. It is the biggest pool in the area. In the Wasson pool of Yoakum and Gaines counties, 34 of the 38 wells drilled were completed for oil wells during the period. The Fullerton pool in Andrews County was quite active and practically doubled in size with the addition of six oil wells. One hole was junked and another was completed as a gas well from the Yates sand.

There were 50 wildcat tests drilled

WEST TEXAS
Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Abell Permian	2	2	32	0	0
Abell	7	6	4,299	0	1
Apco-Warner	7	7	8,097	0	0
Barnhart	11	10	19,429	0	1
Byrd	1	1	216	0	0
Clara Couch	3	1	150	0	2
Eaves	1	1	130	0	0
Embar Ellenburger	8	7	6,028	0	0
Embar Permian	7	6	977	0	1
Emma	1	1	813	0	0
Emperor	1	1	989	0	0
Estes	3	2	505	0	1
Foster	1	1	599	0	0
Fullerton	8	6	10,878	1	1
Funk	1	0	0	0	1
Goldsmith	6	6	961	0	0
Halley	1	1	248	0	0
Howard-Glasscock	2	2	435	0	0
Iatan-East Howard	4	4	1,052	0	0
Keystone-Colby	8	8	1,361	0	0
Lehn	2	2	203	0	0
Mascho (includes W. Fuhrman)	18	17	2,500	0	1
McCamey	7	7	1,179	0	0
Means	2	2	475	0	0
Munger & Nix	1	1	120	0	0
Noelke	7	4	7,044	2	1
North Cowden	7	7	1,422	0	0
Olson	1	1	162	0	0
O'Neal	1	1	61	0	0
Pecos Valley high gravity	1	1	96	0	0
Sand Hills	6	6	3,479	0	0
Seminole	1	1	908	0	0
Sharon Ridge	4	4	742	0	0
Shipley	3	2	401	0	1
Slaughter	111	111	78,294	0	0
South Cowden	2	2	632	0	0
South Sealey	1	1	327	0	0
South Shipley	1	1	67	0	0
Spencer	2	1	144	0	1
Taylor-Link	15	10	2,014	0	5
Tobarg	3	3	156	0	0
Walker	7	5	297	0	2
Waples-Platter	1	1	112	0	0
Wasson	38	34	15,147	0	4
Weiner	6	4	981	0	2
White & Baker	6	6	390	0	0
World	6	6	593	0	0
Wildcats	50	6	7,706	1	43
Miscellaneous	8	0	0	0	8
Total	401	320	182,850	4	77

WEST TEXAS
Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	64	52	1	11	293,683
February	70	59	1	10	302,627
March	72	58	1	13	324,288
April	64	55	0	9	298,114
May	71	56	0	15	317,384
June	60	40	1	19	292,706
First half 1943	401	320	4	77	1,828,802

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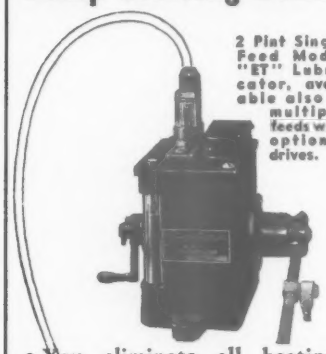

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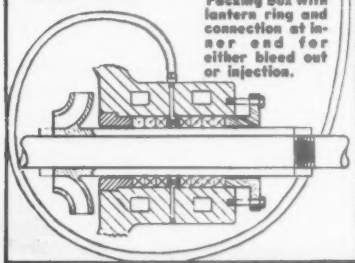

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in the West Texas area during the first half of the year with six of them being completed for oil wells and one a gas well. Wildcatting was widely scattered. The total of wildcats completed during the period compares favorably with the 59 wildcats finished during the first 6 months of 1942.

The balance of the year will probably see a further increase in the Ellenburger prospecting. The Clear Fork which came into prominence during 1942 is not being neglected but is being examined as the wells are drilled to the deeper Ordovician pays. Practically all of the wildcats being started in the area set large enough surface pipe to drill to either the Clear Fork or Ellenburger. If an outstanding Clear Fork pool were encountered drilling would probably cease at that point but unless something big is uncovered the tendency is to continue on to the Ellenburger with the upper pays scheduled for development through secondary exploitation.

TEXAS PANHANDLE

Ruling of the petroleum administrator for war early in the year that no more gas wells could be drilled in the Texas Panhandle area curtailed drilling activity sharply. Routine drilling for oil accounted for 105 wells being completed in the district, 70 of which were oil wells, 23 gas wells and 12 dry holes.

The drilling in the oil-producing areas was routine and no important extensions were recorded. An Ellenburger test in Armstrong County which was currently active on June 30 is the area's outstanding test and is being watched closely. The test is actually between the Panhandle and the Permian basin districts and if successful would open up a large area

TEXAS PANHANDLE
Summary of Wells Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Carson	13	8	2,464	5	0
Gray	29	19	2,089	5	5
Hutchinson	49	41	6,565	3	5
Moore	9	2	82	7	0
Oldham	1	0	0	0	1
Potter	2	0	0	2	0
Wheeler	2	0	0	1	1
Total	105	70	11,200	23	12

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	19	9	7	3	50,807
February	23	14	9	0	37,012
March	16	13	0	3	37,012
April	17	11	4	2	40,512
May	18	13	2	3	53,322
June	12	10	1	1	37,670
First half 1943	105	70	23	12	291,678

NEW MEXICO

Both wildcatting and field work in southeastern New Mexico were light during the first 6 months of 1943 with only 14 wildcat tests and 85 field wells being drilled. The single discovery uncovered by the wildcatting campaign was very light being a 26-bbl. well in Eddy County.

The bulk of the drilling was in the Jackson-Grayburg and Square Lake fields in Eddy County and the Maljamar pool in Lea County. There were 23 completions in the Jackson-Grayburg pool, 21 of which were oil wells adding a daily potential 4,526 bbl. In the Square Lake pool, all of the 14 wells were completed for oil wells and 1,482 bbl. potential was added. One dry hole was registered in the Maljamar pool out of 20 completions reported and the potential hiked 4,921 bbl. by the work.

The most closely watched well in the district, and the most disappointing, was the deep test by Atlantic and Olsen 1 Langlie in Lea County which was carried to a total depth of 9,594 ft. and was tested at numerous points. Most promising zone was the lower Permian at 4,859 ft. The Simpson sand showed possibilities at approximately 8,200 ft. The Ellenburger topped at 9,110 ft. was dry. The well was still an active operation July 1, an attempt being made to complete it in the lower Permian.

Wildcatting prospects for the remainder of the year do not seem to be as bright as last year when there was considerable interest in the area. The prospects of deeper production in Lea County are encouraging and most operators are interested due to the recent discoveries in the Ellenburger along the Permian producing trend in Winkler County, Texas. So far this has assumed a watchful-waiting phase rather than an active exploratory campaign with only one Ellenburger wildcat being active in Lea County at the midyear point.

SOUTHEAST NEW MEXICO
Summary of Completions for First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Artesia	1	1	200	0	0
East Lusk	3	0	0	0	3
Eunice	1	0	0	0	1
Jackson-Grayburg	23	21	4,526	0	2
Langlie	1	0	0	1	0
Leonard	2	2	690	0	0
Loco Hills	2	1	792	0	1
Lynn	1	1	840	0	0
Maljamar	20	19	4,921	0	1
McMillan	3	1	75	1	1
Penrose	1	1	20	0	0
Red Lake	3	2	14	0	1
Rhodes	2	2	177	0	0
Russell	2	2	61	0	0
South Eunice	4	4	1,128	0	0
South Lovington	1	1	48	0	0
Square Lake	14	14	1,482	0	0
West Lusk	1	0	0	0	1
Wildcats	14	0	0	0	14
Total	99	72	14,974	2	25

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	17	13	0	4	54,018
February	13	11	0	2	32,040
March	26	14	0	12	75,980
April	11	7	1	3	34,270
May	19	15	1	3	55,232
June	13	12	0	1	37,670
First half 1943	99	72	2	25	290,210

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CALIFORNIA

Record Demand Combined With Low Rate Of Discovery Drops Coastal Reserves

by L. P. Stockman

IN the face of an abnormally high demand, the highlight of operations during the first half of 1943 was the substantial reduction in California's crude-oil reserves. The reduction in reserves in the 6 months is at an annual rate of over 200,000,000 bbl., indicating a small number of new fields discovered and relatively unimportant developments in proved fields. The 6 months reduction is the largest in recent years. In 1941 California crude-oil reserves were reduced 116,162,000 bbl. In 1942 reserves were reduced 156,295,000 bbl. so that in the past 30 months the state's crude-oil reserves have been reduced aproximately 390,000,000 bbl.

Two oil fields and three gas fields were discovered during the past 6 months. One of the oil fields, Wheatville in Fresno County, is of doubtful value as the small amount of oil sand penetrated indicates an accumulation of secondary importance. The Pleasant Valley field, however, may prove to be of importance as the productive Eocene in that area is quite prolific. Commercial gas discoveries made at Lodi, Mendota and Thornton indicate that natural-gas reserves have been maintained during the past several years. A recent check indicated that current gas reserves are at the highest peak ever reached despite the substantial withdrawals at Rio Vista during the past year. A recent probable discovery of a new deeper productive zone at Rio Vista would more than offset total withdrawals to date. This well, Standard's 5 Midland fee in 4-3n-3e, has not yet been completed but on a formation test showed up exceptionally well and is expected to prove commercially productive in the lower zone.

California operators completed 658 wells in the first half of 1943, 525 oil wells, 14 gas wells and 119 dry holes. Development work is expected to pick up during the last half of the year due to the establishment of supply depots and the freeing of additional equipment. All but a small part of current drilling is in proved fields, especially those that produce a heavy grade of crude oil, badly needed to

PRODUCTION—CALIFORNIA

(In thousands of barrels)

SAN JOAQUIN VALLEY

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Antelope Hills	376	13	19	1
Belridge, North	1,024	1,059	66	57
Belridge, South	1,043	379	374	214
Canal	775	574	39	37
Coalinga	15,184	8,045	1,453	1,250
Coles Levee-Tupman	2,972	2,338	99	118
Edison	454	514	105	112
Elk Hills	2,498	1,921	231	211
Fruitvale	1,252	1,134	170	170
Greeley	2,274	1,307	79	76
Helm	59	26	6	4
Jacalitos	63	21	7	4
Kern River	3,434	2,761	2,594	2,199
Kettleman	7,731	5,756	257	278
Lost Hills	671	705	375	375
McKittrick	856	900	276	271
Midway-Sunset	10,093	9,981	3,305	3,117
Mountain View	814	858	174	164
Mount Poso	4,008	3,463	425	396
Paloma	131	131	2	2
Pleasant Valley	55	.....	2	.....
Raisin City	153	136	8	9
Rio Bravo	2,661	2,025	99	98
Riverdale	134	22	18	4
Round Mountain	2,045	1,863	264	239
Strand, West	284	224	12	12
Ten Section	3,520	2,254	118	119
Wasco	339	261	12	13
Wheeler Ridge	46	50	34	34
Miscellaneous	102	160	12	21
Total	65,051	48,881	10,537	9,600

COASTAL DISTRICT

Aliso Canyon	367	342	19	15
Capitan	566	104	54	46
Del Valle	229	131	11	11
Elwood	694	329	53	78
Gato Ridge	601	542	20	16
Newhall Potrero	965	532	37	22
Oak Canyon	138	65	7	5
Padre Canyon	173	164	17	18
Rincon	600	417	70	70
San Martinez	224	85	12	6
San Miguelito	771	489	28	25
Santa Maria	1,784	870	264	199
Santa Maria Valley	4,013	2,517	240	208
Ventura Avenue	7,565	6,200	399	381
Ventura-Newhall	847	839	502	517
Miscellaneous	32	39	28	33
Total	19,569	13,665	1,761	1,655

LOS ANGELES BASIN

Brea Olinda	2,135	1,593	404	404
Coyote, East	1,043	900	127	117
Coyote, West	2,215	1,679	113	105
Dominguez	4,696	3,476	287	266
El Segundo	183	221	33	35
Huntington Beach	6,225	5,290	691	629
Inglewood	3,455	3,209	279	276
Long Beach	5,918	6,668	1,150	1,162
Los Angeles-Salt Lake	99	98	97	98
Montebello	1,992	1,885	353	340
Playa del Rey	502	636	114	128
Potrero	170	176	25	23
Richfield	1,355	1,432	310	309
Rosecrans	1,152	1,398	179	183
Santa Fe Springs	3,717	3,801	561	578
Seal Beach	1,469	1,464	132	132
Torrance	1,388	1,573	612	630
Turnbull Canyon	63	40	5	2
Whittier	186	179	159	158
Wilmington	17,068	16,181	1,112	1,088
Yorba Linda	157	.....	12	.....
Miscellaneous	34	10	5	3
Total Los Angeles Basin	55,222	51,909	6,760	6,667
Total California	139,842	114,455	19,058	17,927

meet increased demand for fuel oil. Total footage drilled aggregated 2,142,207 ft., reflecting development work in comparatively shallow fields such as South Belridge, Kern Front, Midway-Sunset, Round Mountain, Edison, Mount Poso and other similar districts where production is found from 750 ft. to 3,000 ft.

Crude-oil production during the half year averaged 772,606 bbl. daily, which is at an annual rate of approximately 282,000,000 bbl. This is the highest daily average production since 1929 when Long Beach, Huntington Beach and Santa Fe Springs were undergoing their simultaneous deep-zone development. Due to the lack of undeveloped primary fields, operators have returned to the older fields in an effort to develop additional production and it is in these older fields that operators are centering their attention.

Promising Undeveloped Reserves

One of the most important of the undeveloped reserves is the Ford zone in the Long Beach Harbor section of the Wilmington field as well as the so-called tar zone. The Ford zone has been developed in the Terminal section of the Wilmington field but is still being held back in the Long Beach Harbor section of the field. The reserve in this zone has been estimated from 100,000,000 to 250,000,000 bbl. The tar zone, which is receiving very little attention, probably contains a reserve of another 50,000,000 bbl.

Inglewood may be another field that will show a substantial appreciation with additional development as it has not been determined how extensive the Sentous zone may be. The Ford and tar sands have been proved productive at Wilmington and the Sentous has been found productive at Inglewood so that these three zones are known to exist. Several other fields present good deep-zone possibilities but have not yet been tested. In this group are Ten Section, Newhall-Potrero, San Miguelito and Ventura Avenue. There are probably others but this group will suffice for the present to show that the California oil industry is not going out of business after the war is over. The drilling that has taken place throughout the state has changed the productive order of some fields. South Belridge, for instance, produced more oil than North Belridge during the first 6 months of 1943 and will likewise produce more during the next 6 months. This reflects the extension of the productive limits of South Belridge, which is still producing from the Pleistocene and Pliocene as compared with North Belridge with its Pliocene, Miocene and Eocene production.

California crude-oil production has just about reached its peak although development work during the next several months may arrest the decline. There are very few fields in the state that can be increased to any extent and there are some that might have to reduce crude-oil production in order to prevent gas waste. Some high gas-oil ratio wells have already been shut in but it is not likely that the maximum reduction in gas production has yet been effected. Several fields producing natural gas exclusively have been shut in for over 30 days and in two others, Goleta and Santa Barbara County and Playa Del Rey in Los Angeles Basin, gas storage has already been started.

CALIFORNIA

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Aliso Canyon	1	1	27	0	0
Antelope Hills	11	9	2,176	0	2
Belridge, North	1	1	207	0	0
Belridge, South	77	75	3,859	0	2
Brea Olinda	4	4	1,065	0	0
Buena Park	1	0	0	0	1
Buena Vista Hills	31	30	1,539	0	1
Coalinga, East	56	56	5,814	0	0
Coalinga, West	14	13	729	0	1
Coyote, East	1	1	90	0	0
Coyote, West	3	3	2,128	0	0
Del Valle	1	1	900	0	0
Dominguez	2	1	61	0	1
Edison	2	1	101	0	1
Elk Hills	17	17	4,880	0	0
Fruitvale	2	2	272	0	0
Gato Ridge	2	2	463	0	0
Greeley	3	3	2,638	0	0
Helm	4	1	265	0	3
Huntington Beach	30	29	3,863	0	1
Inglewood	1	1	875	0	0
Jacalitos	1	1	21	0	0
Kern Front	64	64	5,299	0	0
Kettleman N. Dome	2	1	113	0	1
Lodi	3	0	0	3	0
Los Angeles-Salt Lake	1	0	0	0	1
Lost Hills	9	9	259	0	0
McKittrick	5	5	294	0	0
Mendota	2	0	0	2	0
Midway-Sunset	79	66	4,303	0	13
Montebello	11	11	905	0	0
Mount Poso	18	16	1,135	0	2
Newhall Potrero	4	4	1,148	0	0
Newport	1	1	25	0	0
Oak Canyon	2	1	227	0	1
Playa Del Rey	1	1	37	0	0
Pleasant Valley	3	2	2,025	0	1
Rincon	2	1	20	0	1
Rio Vista	10	0	0	9	1
Riverdale	15	13	3,129	0	2
Round Mountain	21	18	1,504	0	3
San Martinez	2	2	753	0	0
San Miguelito	1	1	350	0	0
Santa Maria	5	2	1,766	0	3
Santa Maria Valley	11	9	3,092	0	2
Seal Beach	1	1	850	0	0
Strand, East	2	1	550	0	1
Torrance	8	8	453	0	0
Turnbull Canyon	1	1	76	0	0
Tupman	3	3	1,588	0	0
Ventura Avenue	6	6	8,775	0	0
Ventura-Newhall	5	2	268	0	3
Wheatville	1	1	130	0	0
Wilmington	15	15	2,992	0	0
Yorba Linda	8	8	1,319	0	0
Wildcats	71	0	0	0	71
Total	658	525	75,358	14	119

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	91	73	1	17	300,116
February	79	63	0	16	256,483
March	117	94	2	21	374,032
April	111	84	6	21	376,759
May	119	93	3	23	398,668
June	141	118	2	21	436,149
First half 1943	658	525	14	119	2,142,207
First half 1942	380	222	18	140	1,836,523
Difference	278	303	4	21	305,684

Slump in Wildcatting

There are not very many promising wildcats under way at present. Continental 1-G Kern County Land in the McClung area southeast of the Greeley field in Kern County appears to have considerable merit. It is in 4-30s-26e, and along the line of folding that contains the Rio Bravo and Greeley fields both of which are of primary importance. Standard and Continental have both been aggressively leasing in that general area and there is very little unleased acreage available. Union Oil Co. has been leasing west of the Rio Bravo field on the possible assumption there may be another line of folding extending northwest from the East Strand field which is located south of Greeley. This section of the San Joaquin Valley is very important because if production is found it should be extensive and prolific. Then, too, there are three possibly productive horizons, the Stevens, Rio Bravo and Vedder all of Miocene age. Richfield Oil Corp. has returned to the Tejon district in the extreme southern end of the San Joaquin Valley where there are several favorable structures. The company's present wildcat, 4 Tejon Ranch in 34-11n-19e, appears to be running somewhat higher structurally than other tests in the region. General Petroleum Corp. is preparing to begin drilling at Norwalk in Orange County where it has tied up a solid block of acreage. Norwalk is located south of Santa Fe Springs which contains the greatest thickness of productive formation in the eastern side of the Los Angeles Basin. The test will be drilled on a combination geological and seismograph survey that showed promise.

A review of the amount of crude and refined oil in storage at Pacific Coast points should remove any doubt about the seriousness of the situation in the West and the urgent need to substantially increase crude-oil reserves. In the last 5 years fuel-oil stocks have been reduced over 30,000,000 bbl. and today stand at 40,700,000 bbl. with a large part earmarked for military and naval use. Heavy crude-oil stocks have been cut 6,500,000 bbl. during the same period of time and today total 9,700,000 bbl. Since the war fuel-oil stocks have been reduced about 11,000,000 bbl. despite the large increase in production of heavy grades of crude oil which for the most part go into fuel-oil stocks. Fuel-oil demand has averaged over 400,000 bbl. per day during the current year to date which is more than 50 per cent of total state production of crude oil. The present fuel-oil demand is the highest ever recorded and a further increase is anticipated later this year and extending over into 1944 if present hostilities continue.

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TULSA, OKLAHOMA

Discovery of Oil in Katy Distillate Field Is Outstanding Gulf Coast Development

by T. F. Smiley

DISCOVERY of an excellent oil sand in the big Katy area of Waller and Harris counties, previously supposed to be productive of gas and distillate only, provided a dramatic chapter in the chronicle of an eventful half year in the Texas Gulf Coast territory. The revelation was made by Stanolind Oil & Gas Co.'s 1 Pattison, a Waller County wildcat test 2½ miles north of the nearest production in the Katy gas field. The Pattison had been expected to find gas and distillate, if it found anything. It did find them in three different sands. But testing the 6,600-ft. level—other wildcats had not done that—it struck production of 153 bbl. daily of 45.3-gravity oil through ⅛-in. choke.

Disclosure of this unsuspected oil sand transformed the whole outlook of the Katy area. Its full significance had not been measured at the close of the first 6 months of the year. Geologists said several possibilities invited consideration. The newly revealed oil sand might be coextensive with the gas-condensate sands of the Katy field. Or it might skirt the 45-mile perimiter of the field. Then again, Stanolind might merely have struck a pocket of oil. It was agreed that the drill would have to find the answers to questions which the new well propounded.

Operators began staking locations for miles around the circumference of the giant Katy structure. One of these, still under way at the end of June, was in Fort Bend County, 3½ miles south of Katy, and the first of these exploratory ventures to start in that county. But opening of an oil field where it had been supposed only a gas-condensate field existed created many problems that had to be solved before there could be orderly and economic development. PAW officials and operators with holdings in the affected district held conferences at which a program adapted to the new conditions was worked out.

The surprise uncovered at Katy lent added interest to an announcement that the Conroe field, in Montgomery County—biggest oil field in the Texas Gulf Coast territory in point of reserves and proven acreage—was to be the scene of a deep test to determine whether or not Wilcox production underlies the Cockfield, from which Conroe is a prolific producer. Albert Plummer and D. B. McDaniel, independent operators, staked location in May for 1-A Keystone Mills Co., which is to be a 12,500-ft. test in the center of the big field. The test had not been spudded at the close of June. An effort was made in 1939 to establish production in the Wilcox, but it yielded only minor shows, and the test was abandoned at about 10,000 ft.

Completion last January by Glenn H. McCarthy, Inc., of a 486-bbl. discovery, 1 Hankamer-McLean, in the Lopez Survey, Jefferson County, which extended production of the Stowell field about 2 miles to the north, set off a swift-moving period of lease and royalty buying. Importance attached to the Stowell area, as exemplified in the character of lease transactions, was based largely upon the reported logging by the Hankamer-McLean of about 120 ft. of productive oil sand. This well, producing from the Frio formation, was drilled on the strength of geophysical and subsurface data.

Thousands of acres of leases changed hands within a few weeks, prices ranging from $15 to $300 an an acre. The first big purchase was by Phillips Petroleum Co., which was reported to have paid about $550,000 for a half interest in the McCarthy discovery and in some 27 different tracts. Most of the buying was on a line southwest of the McCarthy well, through the town of Winnie, in northeastern Chambers County. Atlantic Refining Co. was reported to have obtained leases on about 1,000 acres. Texas Co. added 300 acres to its holdings near the discovery. Southwest of Winnie, in Chambers County, Sun Oil Co. was reported to have bought 300 acres of leases. McCarthy added to his holdings.

Of 14 wells completed in the Stowell field during the first 6 months of the year 10 were producers, with average initial yield of 555 bbl. daily. Three of the wells were completed dually. In 1942 there were 15 completions, all producers.

Prospects that the Old Ocean field, in Brazoria County, would set up a new record for deep drilling came within 627 ft. of fulfillment at 1-B McDonald, an operation of J. S. Abercrombie and Magnolia Petroleum Co. Bottomed at 14,378 ft., it did become the deepest test for oil ever drilled in Texas and the third deepest in the world; but it left Continental Oil Co.'s well in the Wasco field of Kern County, California, in possession of the world record of 15,004 ft. The course of 1-B McDonald was uneventful until it lost several joints of drill pipe and was forced to abandon its objective. It was plugged back and dually completed at higher levels.

A wildcat project which had not reached a conclusive stage, but which was being watched with interest as the second half of 1943 began, was that of Humble Oil & Refining Co. at its 1-B Texas Long Leaf Lumber Co., 1½ miles northwest of Splendora, in Montgomery County. The location is on a 3,000-acre tract about 20 miles northeast of the prolific Humble field, in Harris County, and about the same distance southeast of the big Conroe field. Small encouragement attended earlier wildcat ventures in the Splendora area. A little gas and distillate were found in a test which went to the Cockfield about 500 ft. south of the 1-B Texas Long Leaf Lumber Co. It was abandoned.

Many observers expressed belief that an important oil reserve was tapped when Humble completed its 1-B Houston Farms Development Co., opening the Hall's Bayou area in Brazoria County to production. This well, which flowed 610 bbl. of 46-gravity oil in 24 hours from pay topped at 10,258 ft., was expected to arouse renewed interest in Frio sand development below the 10,000-ft. level.

Jackson County, which witnessed

lively drilling operations in 1942, continued to hold top place in point of wildcat completions during the first half of 1943; but interest in other Gulf Coast regions was mounting, while 16 wildcat failures had taken some of the edge off exploratory zeal in Jackson County. Also the opening of five new fields in that county last year left a diminished area for further new work.

One of the largest gas wells in Jackson County was W. Stewart Boyle and Sterling Oil & Refining Corp. 1 Levy, which opened the Sterling field last April, but was not completed till June. This wildcat, 3½

(Continued on Page 164)

PRODUCTION—TEXAS GULF COAST

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Austin County:				
Raccoon Bend	921	693	162	160
Brazoria County:				
Damon Mound	35	41	27	29
Danbury	173	95	20	15
Hastings	7,306	4,170	688	685
Lochridge	346	327	36	42
Manvel	1,277	827	281	177
Old Ocean	2,230	1,818	113	114
Rowan	50	62	7	8
West Columbia	883	967	145	156
Miscellaneous	58	203	8	21
Total	12,358	8,514	1,325	1,247
Chambers County:				
Anahuac County	3,005	2,270	357	367
Barbers Hill	1,251	1,638	137	169
Cedar Point	246	119	16	17
Cotton Lake and South	261	359	46	57
Fig Ridge	247	111	24	19
Oyster Bayou	226	66	18	9
Red Fish Reef	249	143	15	16
Seabreeze	102	52	11	14
Turtle Bay	240	264	39	38
Willow Slough	67	43	7	13
Miscellaneous	18	22	3	10
Total	5,912	5,065	673	729
Colorado County:				
Sheridan	42	21	3	5
Miscellaneous	18	25	4	5
Total	70	46	7	10
Fort Bend County:				
Big Creek	66	55	16	24
Blue Ridge	95	180	45	58
Clodine	106	84	17	11
Sugarland	451	271	51	52
Thompson	3,908	2,274	344	357
Miscellaneous	30	51	12	22
Total	4,656	2,915	489	524
Galveston County:				
Alta Loma	77	38	6	4
Caplen	128	90	14	17
Dickinson-Gillock	897	872	160	225
Greens Lake	9	10	1	2
High Island	429	468	59	62
Hitchcock	90	63	13	13
League City	347	285	74	31
Total	1,977	1,826	327	354
Hardin County:				
Arriola	36	61	12	11
Batson	113	135	158	217
Saratoga	119	127	222	257
Silsbee and West	345	366	43	44
Sour Lake	167	153	148	154
Total	780	842	583	683
Harris County:				
Clear Lake	442	288	38	59
Dyersdale	282	226	49	39
Eureka Heights	245	265	23	35
Fairbanks	1,262	1,321	292	306
Goose Creek	202	257	84	94
Humble	393	408	228	282
Mykawa	70	120	29	30
Pierce Junction	250	300	64	81
Satsuma	65	42	9	12
South Houston	607	302	90	96
Tomball	1,503	1,628	454	481
Webster	2,894	1,671	213	210
Miscellaneous	86	75	16	32
Total	8,301	6,903	1,589	1,757
Jefferson County:				
Amelia	819	693	107	112
Clam Lake	58	53	14	14
Fannett	313	211	36	50
La Belle	39	36	4	10
Lovells Lake	1,050	780	96	86
Nome	309	248	40	43
South China	109	68	15	18
Spindletop	197	202	136	145
Stowell	459	91	29	5
West Beaumont	366	356	56	64
Total	3,619	7,343	533	547
Jackson County:				
Cordele	123	204	44	45
Ganado and West	351	257	70	79
Harmon	83	.....	14	.....
Lolita	898	1,127	169	178
Maurbro	181	275	61	44
Mauritz and West	131	31	20	8
Mayo	120	23	29	2
North La Ward	321	219	83	44
West Ranch	2,968	2,445	378	373
Miscellaneous	70	43	19	20
Total	5,246	4,624	887	793
Liberty County:				
Cleveland	41	44	7	10
Esperson	404	447	87	86
Hankamer	110	102	36	34
Hardin	675	625	140	161
Hull	965	1,091	171	207
Martha	96	92	12	12
South Liberty	62	61	35	44
Miscellaneous	.....	1		9
Total	2,353	2,462	488	563
Matagorda County:				
Bay City and West	438	362	57	53
Hamman	256	285	22	31
Markham	123	145	39	50
North Markham	61	134	26	23
Miscellaneous	50	71	16	22
Total	928	997	160	188
Montgomery County:				
Conroe	8,605	5,928	911	938
Miscellaneous	14	34	3	11
Total	8,619	5,962	914	949
Orange County:				
Orange and West	292	365	75	71
Port Neches and West	228	165	41	43
Total	520	530	116	114
Polk County:				
Livingston	283	274	76	86
Segno	764	666	115	121
Miscellaneous	45	48	8	6
Total	1,092	988	199	213
San Jacinto County:				
Mercy	359	45	29	2
Tyler County:				
Joe's Lake	257	404	42	47
Miscellaneous	55	64	4	4
Total	312	468	46	51
Washington County:				
Brenham	1	1	6	16
Clay Creek	102	69	50	54
Total	103	70	56	70
Wharton County:				
Boling	174	176	60	96
Hillje	82	106	14	19
Louise	206	213	36	41
Pickett Ridge	344	326	65	94
Magnet-Withers and North	2,841	1,708	392	387
Miscellaneous	1	4	1	2
Total	3,648	2,533	568	661
Miscellaneous counties	26	.....	5	.....
Total Texas Gulf Coast	61,800	48,351	9,156	9,611

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Never in history has dependable quality meant more than today, when the equipment at hand must keep performing or sacrifice valuable production. Certainly this is true of equipment producing the oil so vital to victory. By that token we are justly proud of the unfailing service of thousands of Parkersburg Pumpers in action today. We are convinced more than ever before that the careful designing, the quality materials and the sound engineering built into these units are fully justified.

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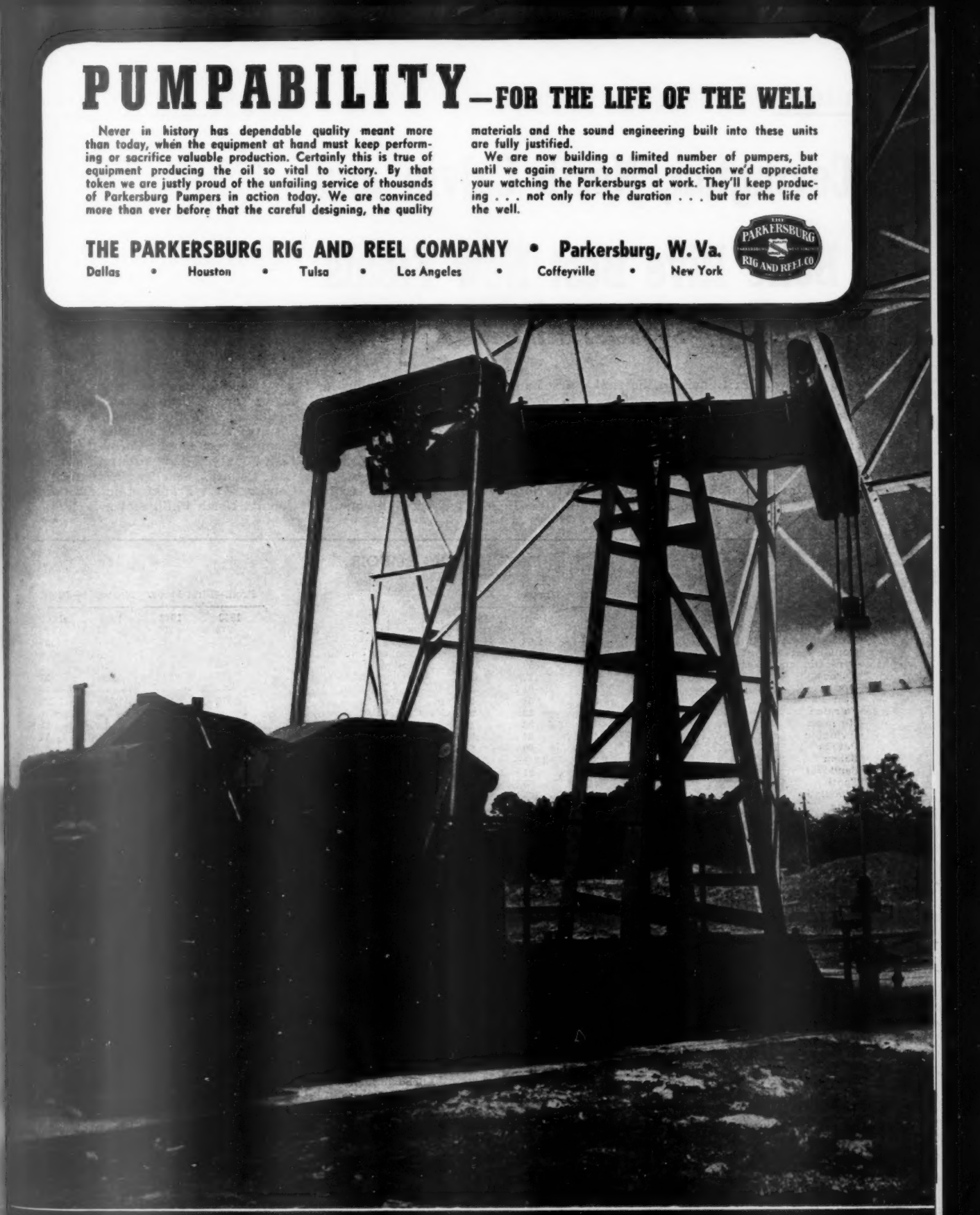


PARKERSBURG DEPENDABLE ENGINEERED PUMPERS

ILLINOIS

Covington, North Calvin and Belle Rive Best New Fields

by James McIntyre

FIELD work in Illinois in the first half of 1943 kept pace with the work in the corresponding months last year, and while there were 15 fewer completed wells the number of oil wells completed was five more than in the first half of 1942 and the number of dry holes was less by 22. The most important discoveries in the first half of this year appear thus far to have been the Covington pool in Wayne County, Belle Rive pool in Jefferson, and the North Calvin pool in White County. Five oil wells were completed in the Covington pool with an average initial production of 159 bbl. No dry holes marred the record. In the Belle Rive pool 11 completions were reported but 4 were failures. The successful wells averaged 170 bbl. in initial production. In the North Calvin pool the six completions included a dry hole. The five successful tests averaged 106 bbl. initially.

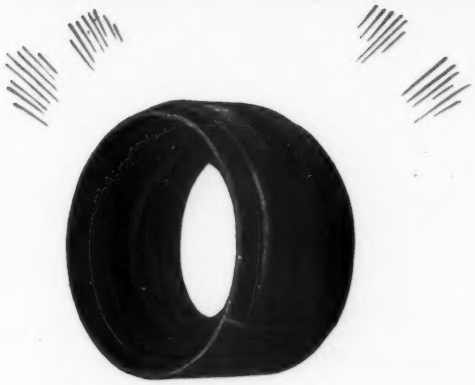
The greatest activity in the state was in the Bible Grove pool in Clay County, Friendsville in Wabash County, New Harmony in White County, Iola in Clay County, Phillipstown in White County, South Lawrence in Lawrence County, and Walpole in Hamilton County.

Wildcatting was carried on in 41 counties in the state and oil was found in 22 tests in 11 counties. Some of these wildcats proved to be extensions to pools, but definitely named new pools included Belle Rive, Covington and North Calvin, already mentioned, and Bennington, Edwards County; North Schnell in Richland County, West Mount Carmel in Wabash County, Mount Auburn in Christian County, Scheller in Jefferson County, West Frankfort in Franklin County, North Phillipstown in White

PRODUCTION—ILLINOIS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Centralia-Salem:				
Bartelso and South	82	95	63	61
Boulder	252	31	29	10
Centralia and West	804	1,326	559	570
Cordes	197	230	127	119
Dix	271	356	81	79
East Patoka	251	346	51	50
Fairman	142	108	23	24
Hoffman	37	54	38	38
Irvington	298	411	84	74
Patoka	152	147	99	94
Salem	5,329	8,316	2,241	2,311
Sandoval	81	119	21	47
Tonti	363	466	65	67
Woodlawn	808	1,936	139	131
King	124	.....	16	.....
Markham City	278	.....	17	.....
Miscellaneous	106	130	145	171
Total	9,655	14,071	3,798	3,846
Louden area:				
Iola	345	.....	35	.....
Louden	7,228	9,629	1,922	1,886
Mason and South	135	58	39	19
St. James	598	791	178	175
St. Paul	52	28	13	5
Miscellaneous	36	57	33	34
Total	8,394	10,563	2,220	2,119
Dale-Hoodville:				
Akin	43	9	6	1
Benton and North	1,351	3,487	242	245
Dale-Hoodville	1,943	2,849	373	310
Rural Hill	974	2,432	184	146
Walpole	437	387	46	27
West Frankfort	56	.....	7	.....
Belle Rive	36	.....	4	.....
Blairsville	345	.....	18	.....
Miscellaneous	13	23	10	21
Total	5,198	9,187	890	750
Wabash River:				
Inman, East and West	295	273	84	45
Iron	168	270	57	58
Keensburg Consolidated	600	864	272	273
Mount Carmel and West	310	629	181	169
New Haven	45	70	21	18
New Harmony and South	2,624	3,886	662	633
Omaha	98	140	21	21
Phillipstown	621	23	55	9
Roland	648	1,046	128	100
South Maunie	206	362	68	61
Stokes	278	208	33	16
Storms	255	411	137	135
Calvin and North	37	.....	2	.....
Friendsville	68	.....	22	.....
Miscellaneous	151	173	95	87
Total	6,378	8,355	1,838	1,625
Clay City:				
Aden and North	124	195	10	71
Albion	189	281	74	74
Barnhill and East	64	86	51	54
Bible Grove and South	437	55	56	6
Bone Gap	97	90	16	8
Bonpas and West	45	45	5	7
Boyleston	242	299	101	99
Centerville and East	260	230	40	23
Cisne and North	83	91	44	41
Clay City and West	1,278	2,215	667	648
Coil and West	193	88	16	7
Dahlgren	29	86	35	37
Dundas and East	784	1,412	292	256
Flora	56	32	17	16
Geff and West	159	.....	19	.....
Johnsonville and South	1,217	3,427	255	265
Mill Shoals	171	580	102	109
Mount Erie and South	96	.....	19	.....
Noble, North and South	1,285	1,312	194	228
West Boos	373	245	71	55
Olney	59	32	34	30
Parkersburg	321	897	39	33
Ste. Marie	59	175	19	10
Sailor Springs	334	159	52	33
Sims and North	775	591	86	38
Covington and South	591	.....	35	.....
Miscellaneous	164	184	60	52
Total	9,485	12,870	2,409	2,200
La Salle anticline:				
Allendale-Linn	386	96	191	205
Bridgeport	912	983	4,400	4,450
Casey	180	201	4,900	4,950
Robinson	627	723	9,050	9,175
Miscellaneous	16	.....	10	.....
Total	2,121	2,003	18,551	18,780
Miscellaneous:				
Colmax-Plymouth	51	54	216	220
St. Jacob	237	.....	25	.....
Others	19	10	5	5
Miscellaneous	307	157	246	300
Total Illinois	41,538	57,200	29,952	29,620



The Story of the Rubber Doughnut

With the advent of deep drilling and higher circulating pressures, the destructive action of abrasive drilling fluid moving at high velocity posed a problem for manufacturers of conventional gate valves and stop cocks. Upon completing a 10,000 foot well it was usually necessary to repair most of the valves in the mud line.

Cameron engineers set out to design a valve expressly for mud line service and departed from the conventional metal-to-metal seal . . . the source of most mud line valve trouble. Instead, they built a valve around a "rubber doughnut" or resilient flow-away insert which would absorb the cutting action of the sand-laden fluid and provide a seat which would imbed trash and cuttings when the gate was closed. Thus, the valve body would be protected against cutting, the valve would seal tightly even with trash on the seat or when the gate had become substantially sand cut, and when the "rubber doughnut" had served its time it could be replaced for a few dollars and thus restore the valve to its initial efficiency. To make this replacement quick and easy . . . a job that any member of the drilling crew could do with ordinary rig tools . . . the valve body was made in two pieces, connected with four bolts. A lip on each side of the resilient flow-way insert would seal the split body. The hubs could be attached to the body by a series of interlocking shoulders and grooves so that the valve would swivel like a union when making up in a manifold. A bumper-type handwheel would make the valve easier to operate under full rated pressure.

Thus, the first and only valve designed expressly for mud line service was built and a competitive test was conducted in the field under identical drilling conditions. The "Flex-Seal" Valve drilled five 10,000 foot wells and then required only a new "rubber doughnut"—$6.50. The conventional valves averaged only one well each and required repairs of approximately $20.00 each.

Complete details on all three models of Cameron "Flex-Seal" Mud Line Valves are carried in your Composite Catalog, or literature will gladly be sent to interested operators on request.

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6000 Lb. Test Model

4000 Lb. Test Model

2000 Lb. Test Model

HIGH PRESSURES OR LOW, "FLEX-SEALS" WILL SAVE YOU MAINTENANCE DOLLARS

County, North Hoodville in Hamilton County, Logan in Franklin County, and North Herald in White County.

Kingwood Oil Co. added another to the considerable list of St. Peter sand failures in its 24 Shanafelt-A, NW NE NE 20-2n-22, which was drilled to 5,256 ft., with the St. Peter topped at 5,253 ft. Maquoketa shale was found at 4,330 ft. and Trenton lime at 4,537 ft., the hole was plugged back and Trenton tested, but it yielded only salt water. The well was not completed at the close of the half year.

The extension of pools already established took up much of the time and money of Illinois operators. Early in the year the Flora pool in Clay County was extended ¾ mile southwesterly by Kingwood Oil Co. and Nickerson 1 A. E. Gatewood, C W½ NE NE 23-3n-6e, a 200-bbl. well in McClosky lime at 2,995-99 ft. Phillips Petroleum Co. in January extended the Phillipstown pool in White County a mile north with 1 Kuykendall, C N½ NE NE 25-4s-10e, a 45-bbl. well, accompanied by 60 bbl. of water, from McClosky lime at 3,076-85 ft.

Elmer Caudell 1 Price estate, NE SE SE 23-1n-12w, in February extended the Allendale pool in Wabash County with a 60-bbl. production from Bridgeport sand at 1,048-51 ft. The first Devonian lime production in the old Patoka pool in Marion County was uncovered by Adams Oil & Gas Co. 10-D Pugh, a 103-bbl. well at 2,892-2,908 ft. N. V. Duncan, Inc., extended the North Calvin pool in White County, with 1 B. Metcalf, SW SW SE 31-3s-14w, a 70-bbl. well in Benoist sand at 2,817-28 ft.

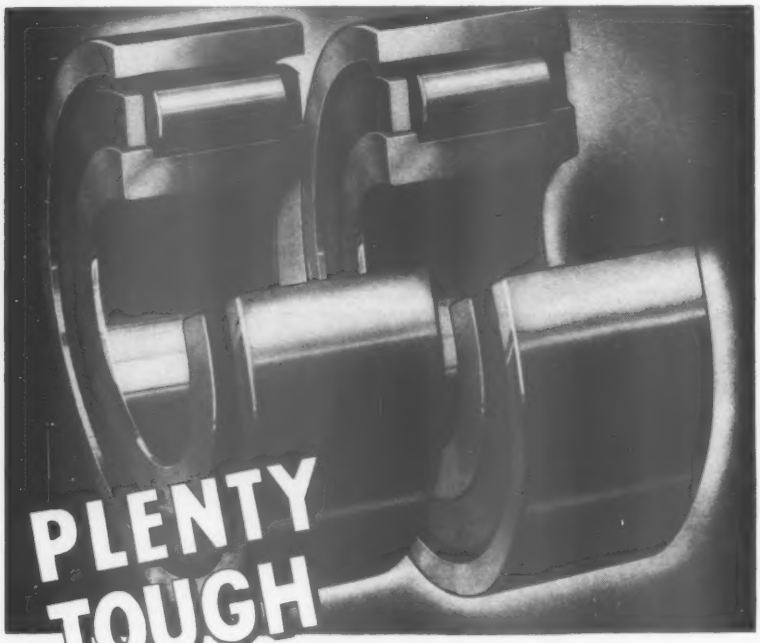
A Devonian lime well was completed in Christian County in March, but it pumped off in 7 hours after producing 22 bbl. of oil. It was Mid-Illinois Petroleum Co. 1 Charles Ralph, C SE NE NE 27-15n-2w. Also in March Larry Romaine extended the Mount Erie pool in Wayne County with 1 C. H. Kinney, C NE SE 16-1s-8e, a 22-bbl. well in Aux Vases sand at 3,124-44 ft., and Seaboard Oil Co. extended the Akin pool in Franklin County, and at the same time discovered a pay new to the pool with 8 U. S. Coal & Coke Co., C NE NE 26-6s-4e. The well started at 275 bbl. of oil and 3 bbl. of water from Aux Vases sand at 3,122-28 ft.

Elmer Caudell 2-C Price estate, C SW SE SE 23-1n-12w, extended the Allendale pool in Wabash County in April. The well started at 100 bbl. of oil and 20 bbl. of water per day from Benoist sand. The first Rosiclare production in the South Mason pool in Effingham County was found in W. R. Braun 1 Trimble, C NW NW SW 26-6n-5e, at 2,433-38 ft. The well produced 65 bbl. initially. A new pay, the Mansfield sand, in the Phillipstown pool in White County, was found in Jarvis Brothers and Marcell, Inc. 5 H. J. Gardner, N½ 31-4s-11e. The well produced 80 bbl. of oil the first day from sand at 1,469-70 ft. E. S. Adkins 1 Brown estate, C SE NE NW 25-7s-2e, a worked-over wildcat, opened the West Frankfort pool in Franklin County. It produced 182 bbl. per day from Levias lime at 2,764-2,878 ft. It had been deepened from 2,138 ft.

E. J. Kubat, in June, extended the Phillipstown pool, in White County, in 1 Johnson, NW SW NW 19-4s-11e, a 35-bbl. well in Degonia sand at 1,981-2,020 ft. Smith & Nye extended the Lawrence pool in Lawrence County with 1 E. Ridgeley, SW SE NE 11-2n-12w, a 50-bbl. well in Benoist sand at 1,708-30 ft.

ILLINOIS
Completions by Fields

Field—	Comp.	Oil	Prod.	Gas	Dry
Akin	4	1	197	0	3
Allendale	8	4	383	0	4
Barnhill	2	1	70	0	1
Bartelso	1	1	3	0	0
Belle Rive	11	7	923	0	4
Benton	4	2	55	0	2
Bible Grove	28	27	3,420	0	1
Blairsville	12	10	2,356	0	2
Bluford	1	1	33	0	0
Boulder	8	6	1,608	2	0
Bridgeport	3	3	197	0	0
Brown	1	1	64	0	0
Calvin	1	1	73	0	0



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Field—	Comp.	Oil	Prod.	Gas	Dry
Clay City	17	17	3,895	0	0
Coil	4	2	101	0	2
Cordes	6	6	115	0	0
Covington	5	5	793	0	1
Dale	17	13	1,174	0	4
Dundas	5	3	140	0	2
East Centerville	3	2	131	0	1
East Centralia	1	1	74	0	0
East Flora	1	1	149	0	0
East Inman	11	10	848	0	1
East Patoka	1	1	8	0	0
Erie	1	1	18	0	0
Fairfield	2	1	260	0	1
Flora	4	4	312	0	0
Friendsville	22	17	1,168	0	5
Grayville	3	1	22	0	2
Griffin	2	2	154	0	0
Geff	1	1	144	0	0
Iola	44	38	5,419	0	6
Iron	1	1	44	0	0
Irvington	1	1	25	0	0

Field—	Comp.	Oil	Prod.	Gas	Dry
Johnsonville	5	4	651	0	1
Keensburg	3	3	145	0	0
Kenner	1	1	22	0	0
King	19	13	1,760	0	6
Lancaster	2	2	50	0	0
Louden	16	14	1,146	0	2
Marcoe	1	1	16	0	0
Markham City	7	5	1,348	0	2
Mason	2	1	30	0	1
Maunee	1	1	19	0	0
Mount Carmel	8	8	441	0	0
Mount Erie	4	2	169	0	2
New Harmony	22	16	2,260	0	6
Noble	11	10	1,235	0	1
North Aden	4	3	312	0	1
North Benton	1	1	32	0	0
North Boos	5	3	723	0	2
North Calvin	6	5	531	0	1
North Inman	1	1	73	0	0
North Maunee	3	2	52	0	1
North Mount Erie	1	1	51	0	0

Field—	Comp.	Oil	Prod.	Gas	Dry
North Noble	2	2	56	0	0
North New Harmony	1	1	48	0	0
North Sims	14	11	1,910	0	3
Olney	2	1	117	0	1
Parkersburg	1	1	70	0	0
Patoka	1	1	103	0	0
Patton	3	3	360	0	0
Phillipstown	28	25	3,404	0	3
Roland	6	4	170	0	2
Rural Hill	15	12	1,066	0	3
Russellville	4	0	0	4	0
Sailor Springs	4	4	231	0	0
St. Jacob	2	2	275	0	0
St. James	2	2	90	0	0
Salem	10	10	746	0	0
St. Paul	3	0	0	0	3
Sims	4	3	237	0	1
South Bartelso	1	1	32	0	0
South Bible Grove	3	2	185	0	1
South Grayville	1	1	92	0	0
S.E. Clay City	1	1	156	0	0
South Johnsonville	2	2	526	0	0
South Lawrence	24	16	1,512	0	8
South Mason	11	9	575	0	2
South Maunee	2	1	15	0	1
South Sailor Springs	6	3	336	0	3
South Stokes	1	1	167	0	0
Stokes	8	7	460	0	1
Storms	2	1	30	0	1
Walpole	23	17	2,455	0	6
West Frankfort	5	4	221	0	1
West Inman	14	12	503	0	2
West Geff	2	2	47	0	0
Woodlawn	12	12	965	0	0
Wildcats	221	22	2,469	2	197
Miscellaneous	18	0	0	0	18
Total	818	485	55,071	10	323

Wildcat Completions

County—	Comp.	Oil	Prod.	Gas	Dry
Adams	1	0	0	0	1
Bond	3	0	0	0	3
Champaign	1	0	0	0	1
Christian	2	0	0	0	2
Clark	3	1	5	0	2
Clay	11	3	945	0	8
Clinton	12	0	0	1	11
Coles	3	0	0	0	3
Crawford	1	0	0	0	1
Cumberland	3	0	0	0	3
Edgar	1	0	0	0	1
Edwards	8	3	215	0	5
Effingham	3	1	21	0	2
Fayette	9	0	0	0	9
Franklin	13	4	492	0	9
Gallatin	2	0	0	0	2
Greene	1	0	0	0	1
Hamilton	10	1	143	0	9
Henderson	2	0	0	0	2
Jasper	2	0	0	0	2
Jefferson	11	1	53	0	10
Kankakee	1	0	0	0	1
Lawrence	4	0	0	0	4
Madison	7	0	0	0	7
Marion	6	0	0	0	6
Mason	1	0	0	0	1
Monroe	1	0	0	0	1
Montgomery	5	0	0	0	5
Moultrie	1	0	0	0	1
Perry	1	0	0	0	1
Randolph	1	0	0	0	1
Richland	5	1	8	0	4
St. Clair	13	0	0	0	13
Shelby	5	0	0	0	5
Wabash	11	1	75	1	9
Warren	1	0	0	0	1
Washington	8	0	0	0	8
Wayne	23	3	388	0	20
Wells	1	0	0	0	1
White	20	3	124	0	17
Williamson	4	0	0	0	4
Total	221	22	2,469	2	197

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	134	77	4	53	347,185
February	146	102	2	42	357,402
March	134	86	1	47	338,553
April	155	82	2	71	381,278
May	113	67	0	46	397,034
June	136	71	1	64	341,844
First 6 mos. 1943	818	485	10	323	2,063,296
Same period 1942	833	480	8	345	2,212,949
Difference	15	5	2	22	149,653

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SOUTHWEST TEXAS

Major Wilcox Discovery Made in Slick Area, Goliad County

by T. F. Smiley

OPENING of Wilcox production in Goliad County, discovery of a good oil sand at shallow depth in Karnes County, substantial additions to gas and distillate reserves, and promise of increasingly active drilling operations along the Wilcox trend were among developments of the half year in Southwest Texas.

In the lower Gulf Coast area 12 counties witnessed wildcat operations, but only four—Bee, Goliad, Jim Wells and Karnes—found production, 13 out of the total of 56 tests meeting success in varying measure. Comparison with the figures for the first half of 1942 shows a marked decline in drilling operations throughout the whole territory. In the lower Gulf Coast district wildcat and field completions fell from 291 to 192. In South Texas they dropped from 277 to 190. There were 36 completions in South Central Texas, in contrast with 63 in the first 6 months of 1942. But oilfield happenings of recent months have aroused high interest in a region which previously had witnessed only minor prospecting. This region includes Bee, Goliad, Karnes and Live Oak counties.

It fell to Continental Oil Co. to complete in the old Slick field area of Goliad County what has been described as the largest Wilcox sand discovery in Southwest Texas. Goliad had been a subject of detailed seismograph and gravimeter work, as a result of which major oil companies and large independents acquired acreage that is expected to see brisk drilling operations in coming months. There was lively leasing in this county in 1940 and 1941, spurred by two plays, the Vicksburg sand trend through the central and southern parts of the county, and the Carrizo-Wilcox sand trend through the northern part. Checkerboard blocks were taken through these trends by major companies, with protection acreage in addition.

Geophysical exploration, subsurface information, and drilling operations indicate that the structure from which Continental's discovery, 1 Woods is producing, is unusually large, with a thick pay sand which promises long-time flow. Initial production of the field opener was 249 bbl. of 36-gravity oil. Continental also opened last February a gas field, the Cabeza Creek, in Goliad County, with initial open flow of 19,000,000 cu. ft.

Karnes County became a center of intense interest with the opening last February of the Hobson field, 7 miles south of Falls City, by Seaboard Oil Co. 1 Rzeppa. This county, which previously had stirred little excitement,

PRODUCTION—LOWER GULF COAST

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Aransas County:				
Aransas Pass	75	533	190	205
Miscellaneous	1	7	1	1
Total	76	540	191	206
Bee County:				
Caesar and South	111	32	31	18
Pettus and North	61	107	78	90
Miscellaneous	41	160	146	135
Total	213	299	255	243
Calhoun County:				
Heyser	1,514	1,337	217	247
Miscellaneous	43	28	8	6
Total	1,557	1,365	225	253
Goliad County:				
Miscellaneous	6	10	2	4
Karnes County:				
Miscellaneous	35	32	30	25
Kleberg County:				
Miscellaneous	6	11	3	3
Jim Wells County:				
Alfred	79	68	22	22
Alice and East	239	267	81	43
Ben Bolt	219	249	67	66
Gandy	64	.....	9	.....
Orange Grove	272	240	36	34
Reynolds	94	113	24	26
Seeligson	198	176	132	50
Wade City	472	571	96	96
Miscellaneous	117	89	79	35
Total	1,754	1,673	546	372
Live Oak County:				
Oakville	97	136	31	28
White Creek and South	82	69	36	36
Miscellaneous	26	11	8	7
Total	205	216	75	71
Nueces County:				
Agua Dulce-Stratton	863	803	236	225
Clara Driscoll and South	512	456	120	125
Flour Bluff and East	302	367	110	113
Luby and North	515	599	149	150
Minnie Bock	381	346	65	63
Saxet	1,114	1,478	327	378
Shield	61	47	10	9
Turkey Creek	225	290	59	55
Richard King	431	295	81	76
Miscellaneous	131	115	35	23
Total	4,535	4,796	1,192	1,217
Refugio County:				
Greta	531	836	209	196
La Rosa	69	346	82	84
Melon Creek	95	59	10	10
Refugio	718	791	192	158
Tom O'Connor	5,314	2,675	448	449
Miscellaneous	31	36	13	8
Total	6,758	4,743	945	905
San Patricio County:				
Midway	505	414	67	50
Odem	251	136	51	30
Plymouth	1,597	1,176	186	185
Taft	140	209	69	69
White Point and East	1,852	1,270	234	239
Total	4,345	3,205	607	573
Victoria County:				
Coletto Creek	68	95	31	32
Cologne	39	33	6	8
Keeran	62	75	20	25
McFadden and North	782	349	92	92
Placedo and East	717	582	178	182
Victoria	31	57	16	17
Total	1,699	1,191	345	356
Miscellaneous counties	12	37	12	14
Total Lower Gulf Coast	21,201	18,118	4,428	4,242

saw geophysical prospecting and leasing plays in 1941, chiefly because of its location on the Carrizo-Wilcox trend. Virtually every part of the county underwent magnetometer or gravimeter survey, and in the southern area there was extensive reflection seismograph work. Blocks of leases were assembled, and five wildcats were drilled in 1942, all failures.

Seaboard's discovery set off a swift drilling and leasing play. Major companies, with leases in the Hobson area, most of them acquired before Seaboard hit the pay, were reported to have extended their holdings, and many independents were in the market for acreage.

Special importance attaches to the Karnes County development not only because, in the Hobson field at least, the pay is at the 4,000-ft. level, but the oil is of high octane quality. At midyear there had been eight completions in the new Hobson field, including two dry holes. The six producers had an average initial yield of 165 bbl. each.

Hondo Creek, 5 miles southeast of Kenedy, was another Karnes County field opened in the first half year, with the pay around 6,590 ft. The discovery, made by Phillips Petroleum Co. and Adams Oil & Gas Co. last February, attracted special attention because its production of 132 bbl., like that in the Hobson pool, was crude, while other strikes in the Wilcox area, comprising Bee, Goliad, Karnes and De Witt counties, had been gas or distillate.

Two other pools, not as significant as the Hobson and the Hondo Creek, but adding definitely to Karnes County's potentialities, were opened in 1943. They were the Burnell (Wilcox), a mile east of Burnell, and the Porter, 6½ miles south of Runge. Five wildcat wells were in varying stages of progress in Karnes County at the end of June.

Important wildcat projects in the Rio Grande Valley, foreshadowed by major lease transactions in recent months, were taking the form of actual drilling operations at midyear. Near the junction of Willacy and Kenedy counties Texas Co. acquired lease on 37,000 acres from Yturria Land & Cattle Co. This acreage had been worked by a geophysical crew. In June Texas staked location for a wildcat test 5 miles northeast of Yturria, in Willacy County. Sinclair Prairie Oil Co. spotted a test a mile east of Raymondsville. With five operations, four of them wildcats, either projected or making hole at the end of June, Willacy County appeared headed for a major drilling program. There were two wildcat completions in Willacy during 1942, both dry holes.

In the South Texas area Starr County nosed out Duval in a neck-and-neck race in the matter of wildcat completions. At the middle of the year the score stood Starr 20, Duval 19. Four of Starr's completions were producers, two of them opening new fields and two recording extensions to old pools. Duval contributed one new field and one new sand discovery. Out of a total of 83 wildcat ventures

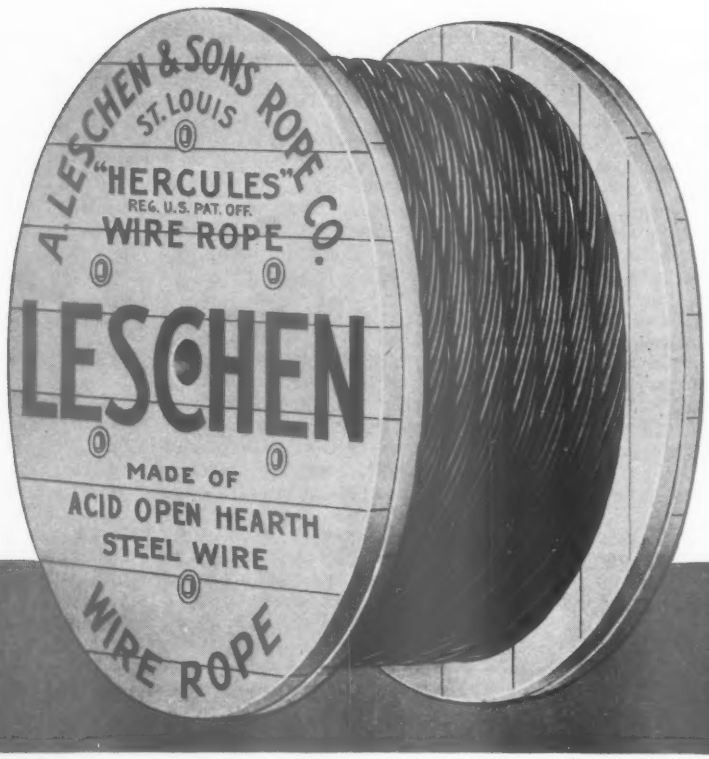
PRODUCTION—SOUTH AND SOUTH CENTRAL TEXAS

SOUTH TEXAS

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Brooks County:				
Alta Mesa	46	137	33	33
Duval County:				
Benavides and E	511	433	219	221
Casa Blanca and W and N	134	88	74	68
Cedro Hill	86	106	77	77
Charamousca and S	50	69	34	34
Driscoll	461	509	75	70
Eagle Hill	83	121	50	53
Fitzsimmons	52	153	78	77
Government Wells	1,054	1,132	627	641
Hoffman	689	762	330	337
Loma Novia	827	831	539	572
Longhorn	173	162	42	42
Lundell	158	171	93	94
Piedre Lumbre	298	279	130	129
Sarnosa	60	61	36	37
Seven Sisters and S	729	1,076	413	421
Tarancahuas	59	66	27	29
Miscellaneous	232	188	120	107
Total	5,656	6,207	2,931	3,009
Hidalgo County:				
Nichols	49	48	13	13
Sam Fordyce	47	159	48	73
Sullivan City	38	85	29	33
Total	154	293	90	119
Jim Hogg County:				
Colorado	151	341	232	210
Kelsey	71	219	110	110
Miscellaneous	84	126	128	118
Total	306	676	470	438
La Salle County:				
Washburn	42	44	12	7
McMullen County:				
Ezzell	121	109	118	128
Jacob	43	39	71	71
Miscellaneous	66	79	71	96
Total	230	217	260	285
Starr County:				
Boyle	59	30	13	11
Guerra	49	34	12	13
Rincon and N	1,126	733	158	142
Sun and N	286	222	96	82
Yturria	45	39	11	12
Miscellaneous	37	74	111	124
Total	1,602	1,132	401	384
Webb County:				
Adami	44	52	65	68
Aviator	42	45	72	73
Bruni-O'Hern-Cole	424	518	272	280
Glen	123	177	71	70
Killam and N	86	119	84	96
Lopez	471	470	308	313
Mirando City	47	48	63	63
Volpe	53	65	28	28
Miscellaneous	96	129	94	105
Total	1,376	1,623	1,057	1,096
Zapata County:				
Comitas	55	66	316	147
Escobas-Jennings	223	237	68	345
Mirando Valley	39	62	28	71
Miscellaneous	7	9	17	31
Total	324	374	429	594
Total South Texas	9,736	11,002	5,683	5,965

SOUTH CENTRAL TEXAS
(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Bastrop County:				
Miscellaneous	52	54	32	30
Bexar County:				
Somerset	45	80	492	769
Miscellaneous	37	49	363	346
Total	82	129	855	1,115
Caldwell County:				
Luling-Branyon	899	963	691	718
Lytton Springs	42	48	136	144
Salt Flat and West	425	544	255	272
Tenney Creek	38	66	22	24
Miscellaneous	57	110	121	141
Total	1,463	1,731	1,225	1,299
Frio County:				
Pearsall	99	103	37	34
Guadalupe County:				
Darst Creek	1,196	1,030	340	343
Miscellaneous	155	18	44	45
Total	1,351	1,048	385	388
Other counties:				
Miscellaneous	91	101	635	642
Total South Texas	3,138	3,166	3,169	3,508



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in South Texas 73 ended in the dry and abandoned column.

The well which opened the Lockhart field, I. K. Howeth's 1 Caffarelli, last March, with initial production of 77 bbl., was followed by a better one, Lockhart & Davenport's 1 First National Bank of Mission, in May, with initial yield of 115 bbl. These wells, the discovery, 5 miles southeast of El Saug, and the other, 1,320 ft. south, stimulated development work, which already was very active, and at the close of the half year there were nine wildcat projects under way in Starr County. One of these, although not yet officially completed, was rated as a discovery in the Frio sand. This was the Baldridge & King 1 Edgerton, 12 miles northeast of Rio Grande City.

There were 11 wildcat completions in Live Oak County during the first 6 months of 1943 and the same number in McMullen County, and all of them were failures. This record did not seem to have dampened drilling ardor, however, for at midyear there were five wildcat operations under way in Live Oak County and three in McMullen.

Sustained interest in Live Oak is explained in large part by the fact that one wildcat project, though still undergoing testing at midyear, opened the Goebel field, 2½ miles northeast of Oakville. This well, Henderson Coquat 1 W. W. Goebel, flowed at the rate of 76 bbl. daily on a drill-stem test, stirring new interest in leases in that spot.

SOUTH TEXAS

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Aviator	14	5	343	0	9
Barbacoas	1	1	5	0	0
Cadena	7	5	417	0	2
Colorado	9	7	443	0	2
Driscoll	6	5	1,004	0	1
East	5	4	428	0	1
East Benavides	1	1	33	0	0
Fowlerton	1	1	10	0	0
Frost	1	1	13	0	0
Glen	3	0	0	0	3
Government Wells	1	1	82	0	0
La Gloria	1	0	0	1	0
Lockhart	2	2	192	0	0
North Sun	9	8	964	0	1
Oakville	1	1	36	0	0
Rincon	8	5	988	0	3
San Ysidro	1	1	20	0	0
Sejita	2	1	148	0	1
South Campana	4	1	55	2	1
South White Creek	5	2	95	0	3
Strake	6	3	562	1	2
Ulrich	2	1	80	0	1
Washburn	6	3	892	0	3
Weil	2	2	14	0	0
Yaeger	1	1	114	0	0
Wildcat failures	73	0	0	0	73
Miscellaneous	20	0	0	0	20
Total	190	62	6,938	4	124

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	42	13	1	28	166,360
February	27	9	2	16	103,782
March	29	9	1	19	120,269
April	37	13	0	24	136,029
May	26	7	0	19	126,727
June	29	11	0	18	112,585
First half 1943	190	62	4	124	765,752
First half 1942	277	123	8	146	1,949,393
Difference	87	61	4	22	1,183,641

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Duval	19	2	124	0	17
Jim Hogg	7	2	122	0	5
La Salle	4	1	10	0	3
Live Oak	11	0	0	0	11
McMullen	11	0	0	0	11
Starr	20	4	260	0	16
Webb	7	1	45	0	6
Zapata	4	0	0	0	4
Total	83	10	561	0	73

LOWER GULF COAST

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Agua Dulce	8	6	984	1	1
Armagosa	3	0	0	2	1
Baldwin	2	1	80	0	1
Bentonville	5	4	502	0	1
Burnell	1	1	87	0	0
Cabeza Creek	1	1	14	0	0
Dinn	1	1	15	0	0
Duck Bay	1	1	162	0	0
East Placedo	1	1	46	0	0
East White Point	1	1	161	0	0
Fox	1	0	0	1	0
Greta	1	1	81	0	0
Gallagher	2	1	162	0	1
Hobson	8	6	971	0	2
Hondo Creek	2	1	132	0	1
Inarl	1	0	0	1	0
Koopman	1	0	0	1	0
La Gloria	2	0	0	2	0
Midway	8	5	574	0	3
Mineral	1	1	124	0	0
Nordheim	2	2	111	0	0
North Magnolia City	1	1	121	0	0
North McFaddin	4	1	304	2	1
Odem	11	9	1,018	1	1
Petronilla	1	1	455	0	0
Porter	3	2	156	0	1
Richard King	6	6	728	0	0

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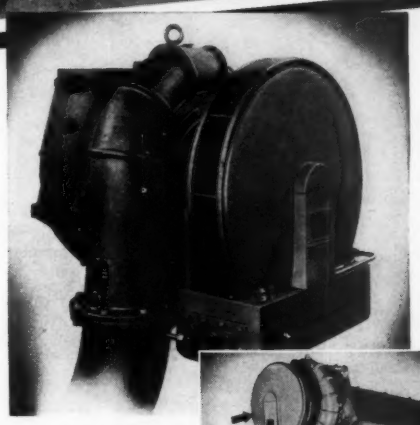

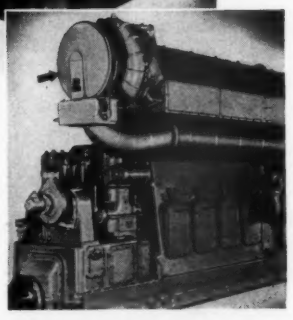

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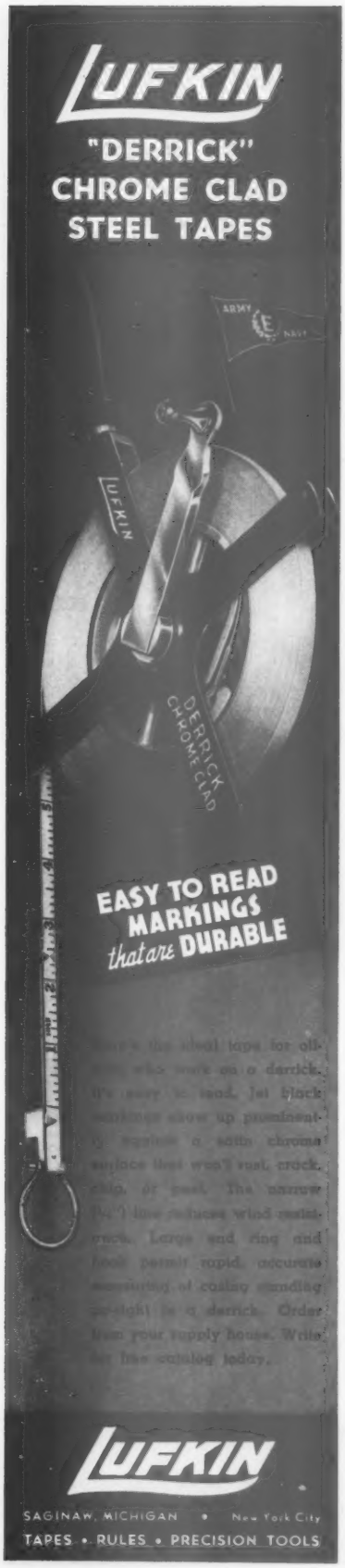

County—	Comp.	Oil	Prod.	Gas	Dry
Riverside	1	0	0	1	0
Rooke	2	2	216	0	0
Seeligson	38	37	4,952	0	1
Shield	1	1	128	0	0
Slick (Wilcox)	1	1	249	0	0
South Caesar	4	4	454	0	0
Stratton	13	11	1,313	1	1
Violet	1	1	6	0	0
Welder	1	1	52	0	0
Wilson	1	1	150	0	0
Woodsboro	2	2	95	0	0
Yorktown	1	1	228	0	0
Wildcat failures	43	0	0	0	43
Miscellaneous	4	0	0	0	4
Total	192	116	14,825	13	63

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	29	16	3	10	179,523
February	35	22	2	11	224,037
March	26	19	2	5	164,399
April	29	21	3	5	176,537
May	39	19	1	19	245,990
June	34	19	2	13	204,672
First half 1943	192	116	13	63	1,195,158
First half 1942	291	185	19	87	1,949,393
Difference	99	69	6	24	754,235

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Aransas	1	0	0	0	1
Bee	11	1	128	0	10
Calhoun	1	0	0	0	1
De Witt	2	0	0	0	2
Goliad	3	2	263	0	1
Hidalgo	2	0	0	0	2
Jim Wells	9	4	338	0	5
Karnes	9	4	455	0	5
Nueces	3	1	6	0	2
Refugio	1	0	0	1	0
San Patricio	6	0	0	0	6
Victoria	8	0	0	0	8
Total	56	12	1,184	1	43

SOUTH CENTRAL TEXAS

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Bee Creek	2	1	61	0	1
Chittim	1	0	0	0	1
Dale	1	1	35	0	0
Imogene	2	1	291	0	1
Pearsall	2	2	100	0	0
Walnut Creek	1	0	0	0	1
Wildcat failures	27	0	0	0	27
Total	36	5	487	0	31

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	10	1	0	9	24,064
February	7	0	0	7	23,103
March	5	0	0	5	15,727
April	5	0	0	5	12,103
May	3	2	0	1	8,181
June	6	2	0	4	15,291
First half 1943	36	5	0	31	98,469
First half 1942	63	14	2	47	116,633
Difference	27	9	2	16	18,164

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Atascosa	2	1	291	0	1
Bastrop	2	0	0	0	2
Bell	1	0	0	0	1
Caldwell	2	0	0	0	2
Dimmit	1	0	0	0	1
Gonzales	2	0	0	0	2
Guadalupe	4	0	0	0	4
Kerr	1	0	0	0	1
Kimble	1	0	0	0	1
Lee	1	0	0	0	1
Menard	1	0	0	0	1
Travis	6	0	0	0	6
Williamson	3	0	0	0	3
Wilson	1	0	0	0	1
Total	28	1	291	0	27

TEXAS GULF COAST

(Continued from Page 148)

miles southeast of Ganado, flowed 46,700,000 cu. ft. of gas daily on a state Railroad Commission gage, with tubing and casing pressures equalized at 1,980 lb. The pay was at 4,910-40 ft.

Geophysical crews were busy in various parts of the Gulf Coast territory as the half-year closed. Southeastern Jefferson, eastern Chambers, and southwestern Liberty counties were areas of special activity.

TEXAS GULF COAST
Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	45	22	3	20	287,401
February	17	8	1	8	113,197
March	29	18	0	11	209,354
April	35	17	2	16	231,705
May	38	16	1	21	280,520
June	32	17	1	14	232,814
First half 1943	196	98	8	90	1,354,991
First half 1942	404	293	17	94	2,644,544
Difference	208	195	9	4	1,289,553

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Brazoria	2	1	620	0	1
Brazos	2	0	0	0	2
Chambers	6	0	0	2	4
Fort Bend	1	0	0	0	1
Grimes	1	0	0	0	1
Hardin	2	0	0	0	2
Harris	5	1	40	0	4
Jackson	18	1	33	1	16
Jefferson	4	1	496	0	3
Jasper	1	0	0	0	1
Lavaca	1	0	0	0	1
Liberty	2	0	0	0	2
Matagorda	8	2	375	2	4
Polk	1	0	0	0	1
Montgomery	2	1	244	0	1
San Jacinto	2	0	0	0	2
Waller	1	1	154	0	0
Wharton	8	1	72	1	6
Total	67	9	2,034	6	52

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Alief	1	1	40	0	0
Blue Ridge	2	0	0	0	2
Boling	9	6	1,504	0	3
Buckeye	2	1	104	0	1
Clodine	5	5	755	0	0
Danbury	2	2	167	0	0
Dyersdale	1	1	72	0	0
Esperson	5	4	1,115	0	1
Francitas	1	1	137	0	0
Friendswood	2	2	1,034	0	0
Ganado	7	7	563	0	0
Halls Bayou	1	1	620	0	0
Harmon	5	4	404	0	1
Hitchcock	1	1	122	0	0
Katy	4	3	429	0	1
Lake Creek	1	1	595	0	0
Lovell Lake	6	5	641	0	1
Lucky	1	1	635	0	0
Maubro	2	2	390	0	0
Mayo	6	6	314	0	0
Mercy	1	1	204	0	0
North La Ward	10	9	1,046	1	0
North Markham	2	2	400	0	0
Old Ocean	2	2	1,472	0	0
Oyster Bayou	6	4	2,258	0	2
Pinehurst	1	1	224	0	0
Saratoga	1	1	10	0	0
Sour Lake	3	1	132	0	2
Stewart	6	3	286	1	2
Stowell	14	10	5,551	0	4
Sugar Valley	1	1	132	0	0
Turtle Bay	1	1	99	0	0
West Mauritz	7	6	1,314	0	1
West Ranch	3	2	242	0	1
Miscellaneous	74	0	0	6	68
Total	196	98	23,031	8	90

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Wood County Paluxy Yields Important Discoveries

by Harry F. Simons

WILDCAT drilling in the East Texas area was centered around Wood County due to the interest caused by the Quitman Paluxy discovery of last fall. There were five wildcats completed in the county, all of which penetrated the Paluxy and one of which went to the Smackover lime at 8,901 ft. One of the wildcat attempts was successful. resulting in the discovery of the Manziel (Cartwright) pool.

In addition to the wildcatting in the county, the development of the Hawkins and the Quitman pools accounted for the bulk of the drilling. There were 25 wells completed in the Hawkins Woodbine pool, 19 of which were producers and 6 dry holes. In the Quitman pool there 17 wells completed, 16 oil wells and 1 dry hole which did not limit production. The 16 wells resulted in a potential of 8,964 bbl. being added to the pool and, as it is not yet defined in any direction, a major pool is a possibility. The wells on the southeast flank of the pool are relatively light, however. There are seven wells drilling at the present time.

The New Hope pool in Franklin County is a possible major field, the discovery well being completed in both the Rodessa and Travis Peak formations. The Rodessa pay is at 7,295-7,305 ft. and it flowed 348 bbl.; the Travis Peak is 7,902 to 8,089 ft. and it flowed 208 bbl. Two wells are now being drilled in the field to further determine its possibilities. The discovery well was the Tide Water and Seaboard 1 A. J. Bacon in the Maxmillian Survey, 4 miles north of Scroggins. The Paluxy sand discovery in Hunt County by Stanolind Oil & Gas Co. opened up considerable area to deep production. One well is currently drilling. Gas-distillate production was found in Nacogdoches County by the Texas 1 G. W. Strahan, Ariola Survey, 7 miles northeast of Nacogdoches.

Kildare

In the Kildare pool of Cass County there were 13 oil wells and one gas well added for a total of 14 completions. The pool was extended 1 mile north by C. C. Gilger 1 E. L. Davis, J. M. Watson Survey. The pool produces from the Gloid lime. There are four active operations in the pool.

Nine wells were completed in the Chapel Hill pool of Smith County but all of this work was in the early part of the year and development was lagging as the period closed. Spacing difficulties are holding up development. There are three active operations at present time.

Out of 62 wildcat tests in widely scattered areas, only four were successful. However, the discoveries in the district during the period were of sufficient importance to sustain interest in the wildcatting campaign with 24 exploratory tests being active on July 1. Deep prospecting continued and the Smackover lime, which lies below the deepest known producing horizon in the area, was attracting attention and several tests penetrated that formation.

Future Drilling

In the coming 6 months activity will probably continue at Hawkins where there is still considerable possible production not yet developed. Quitman will probably see considerable activity, the Kildare pool is not yet outlined and the Manziel pool is just getting under way with five active operations at the present time.

Wildcatting during the rest of the year will probably come close to that performed during the first half of the year with particular emphasis being placed on the Paluxy and on the producing zones in the Trinity series.

EASTERN TEXAS

Completions by Fields

Field—	Comp.	Oil	Prod.	Gas	Dry
Carthage (gas)	2	0	0	2	0
Cayuga	3	1	68	1	1
Chapel Hill	9	9	1,808	0	0
Coke	3	3	419	0	0
Groesbeck	1	1	5	0	0
Hawkins	25	19	5,783	0	6
Kildare	14	13	2,866	1	0
Quitman	17	16	8,964	0	1
Tri-Cities	1	1	148	0	0
Weiland	1	1	213	0	0
Gregg	1	0	0	1	0
Wildcats	62	4	932	1	57
Miscellaneous	3	0	0	0	3
Total	142	68	21,206	6	68

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	20	9	0	11	104,501
February	19	10	2	7	113,888
March	23	13	2	8	101,385
April	23	10	0	13	97,177
May	28	13	2	13	121,030
June	29	13	0	16	145,778
First 6 mos. 1943	142	68	6	68	683,759

PRODUCTION—EAST TEXAS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Mexia fault zone:				
Corsicana	64	69	605	605
Mexia	210	288	204	210
Powell	257	284	149	145
Wortham	71	88	30	31
Miscellaneous	83	87	40	45
Total	735	816	1,028	1,036
East Texas Basin:				
Cayuga	1,750	2,058	276	282
Chapel Hill	349	142	47	25
East Texas	60,818	57,641	24,926	25,557
Coke	75	.....	28	.....
Hawkins	6,161	2,190	385	324
Kildare	171	.....	18	.....
Long Lake and East	702	646	150	147
Navarro Crossing	47	80	21	21
Pittsburg	41	36	5	5
Pleasant Grove	37	30	8	7
Quitman	103	.....	14	.....
Sulphur Bluff	765	773	73	73
Talco	4,639	4,842	729	752
Van	2,232	1,584	589	581
Miscellaneous	72	44	22	7
Total	77,962	70,066	27,291	27,781
Sabine uplift:				
Rodessa	1,258	1,672	38	307
Miscellaneous	53	51	49	80
Total	1,311	1,723	87	387
Southern area:				
Trinity	70	74	14	15
Miscellaneous	5	9	78	70
Total	75	83	92	85
Total East Texas	80,083	72,688	28,498	29,289

Deep Sands Provided More New Oil Than New Fields; Deepest Producer Drilled

by T. F. Smiley

DEEPEST production in the world was achieved by Union Producing Co. et al in the De Large field of Terrebonne Parish, where 1 Fitzpatrick-Vizard flowed 5,970,000 cu. ft. of gas and an unestimated volume of distillate through ¼-in. choke from perforations at 13,475-90 ft. The well was shut in pending a hookup with the United Gas Pipe Line Co. system supplying southern cities. The record for deepest production previously was held by Fohs Oil Co. 1 Buckley-Bourg, in the same field, which was completed at a total depth of 13,266 ft. Fohs has an interest in the new well.

New sands opened in old fields contributed much more to production in coastal Louisiana during the first 6 months of the year than new field discoveries did. Of 1,943 bbl. added to daily production outside that from proven horizons 1,233 bbl. was from new-sand discoveries, and 710 was from new pools. The figures include distillate.

Initial Production Off

Initial production in coastal Louisiana territory was less than half that recorded in the first half of 1942, 20,950 bbl. contrasted with 42,837. There were 170 completions, wildcat and field, compared with 270 in the corresponding period of 1942. Production was found by 93 wells drilled, against 182 producers completed in the first half of last year.

The Pine Prairie field was the scene of greatest drilling activity, as it was last year. Ten completions were recorded there. The seven each in Paradis and Bayou Sale parishes were next highest. The first Wilcox production at Pine Prairie was found by Roy Lee's 1 Crowell-Spencer Lumber Co. in May, with initial yield of 166 bbl. Sparta lime production was opened on the southeast flank of the Pine Prairie dome by C. & I. Production Co. 1 Haas. This well was completed first in February of 1942 as a dry hole at total depth of 8,497 ft. On renewal of the attempt to find production it was plugged back, sidetracked, and drilled to total depth of 9,149 ft., where it was dually completed with initial yield of 230 bbl.

Major-scale distillate production was foreshadowed at midyear in the Erath field of Vermilion Parish, where Texas Co., Humble Oil & Refining Co., Tide Water Associated Oil Co., and Phillips Petroleum Co. have a big recycling plant under construction, and a fast development program was under way at the end of June. Texas had obtained permission to make dual completions of 11 wells in the field to bring production to the highest possible point for the recycling plant. Wells are drilled in the name of Texas Co., which holds about 57 per cent of the block unitized by the four companies named. All, it was said, were to be perforated in the 8,700-ft. level. According to report, some of the shallower sands are even more prolific in their yield of distillate than are the

LOUISIANA GULF COAST

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Anse la Butte	3	1	227	0	2
Avery Island	2	1	186	0	1
Baton Rouge	1	1	136	0	0
Bayou Blue	4	1	149	0	3
Bayou Choctaw	3	0	0	0	3
Bayou Couba	3	1	264	0	2
Bayou des Allemands	2	2	453	0	0
Bayou Sale	7	5	1,136	0	2
Bear	2	2	499	0	0
Branch	1	1	25	0	0
Bully Camp	4	0	0	0	4
Caillou Island	1	1	15	0	0
Cameron Meadows	1	1	117	0	0
Chacahoula	4	1	170	0	3
Charenton	2	0	0	1	1
Convent	2	1	91	0	1
Delacroix Island	1	1	119	0	0
Delta Farms	2	2	415	0	0
East Hackberry	2	2	518	0	0
Egan	1	1	105	0	0
Fausse Point	1	1	228	0	0
Fresh Water Bayou	1	0	0	1	0
Garden Island Bay	2	1	119	0	1
Gibson	1	0	0	1	0
Grand Bay	2	1	336	0	1
Gueydan	3	2	172	0	1
Hayes	1	1	25	0	0
Jeanerette	1	1	292	0	0
Jefferson Island	2	1	680	0	1
La Fourche Crossing	1	1	162	0	0
Lake Chicot	2	2	535	0	0
Lake de Cade	1	1	97	0	0
Lake Fausse	1	1	259	0	0
Lake Long	1	1	325	0	0
Lake Pelto	1	1	227	0	0
Lake Salvador	1	1	173	0	0
Leeville	3	2	319	1	0
Lirette	1	0	0	1	0
Little Bayou	3	0	0	0	3
Napoleonville	1	1	192	0	0
Neale	4	4	1,143	0	0
Paradis	7	7	2,486	0	0
Pecan Island	2	1	10	1	0
Perkins	1	1	165	0	0
Pine Prairie	10	9	1,989	0	1
Port Barre	3	3	293	0	0
Potash	2	2	602	0	0
Quarantine Bay	1	1	281	0	0
Roanoke	2	2	256	0	0
St. James	2	1	80	0	1
Schooner Bayou	1	1	356	0	0
Shuteston	1	1	146	0	0
Ville Platte	5	5	890	0	0
Vinton	7	6	935	0	1
West Bay	1	1	234	0	0
West Cote Blanch	1	1	130	0	0
West Gueydan	1	1	130	0	0
West Hackberry	3	2	2,060	0	1
Miscellaneous	21	0	0	0	21
Wildcat failures	17	0	0	0	17
Total	170	93	20,950	6	71

Wildcat Completions

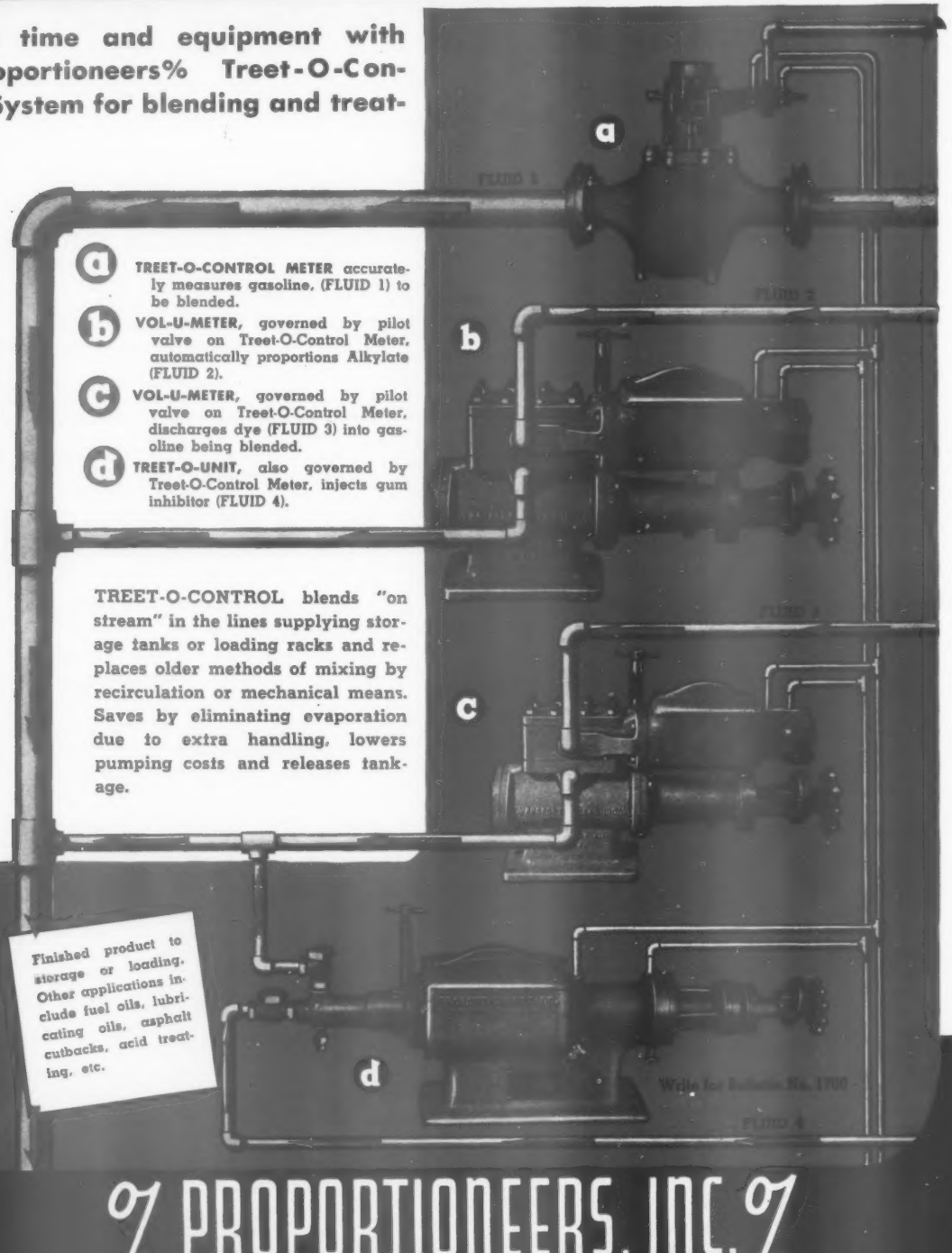
Parish—	Comp.	Oil	Prod.	Gas	Dry
Acadia	2	2	131	0	0
Assumption	2	1	192	0	1
Baton Rouge	1	1	136	0	0
Beauregard	3	1	151	0	2
Calcasieu	1	0	0	0	1
Cameron	3	1	117	0	2
E. Baton Rouge	1	0	0	0	1
Evangeline	2	2	398	0	0
Jefferson Davis	1	0	0	0	1
La Fourche	2	1	162	0	1
Livingston	1	0	0	0	1
Orleans	1	0	0	0	1
Rapides	1	0	0	0	1
St. James	1	1	80	0	0
St. Landry	2	1	146	0	1
St. Martin	1	1	292	0	0
St. Mary	2	0	0	0	2
Terrebonne	1	0	0	0	1
Vermilion	3	2	140	1	0
W. Baton Rouge	1	0	0	0	1
Total	32	14	1,943	1	17

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	28	12	4	12	240,629
February	23	13	0	10	187,507
March	22	14	0	8	199,315
April	30	17	0	13	269,365
May	37	24	0	13	434,079
June	30	13	2	15	248,142
First 6 mos. 1943	170	93	6	71	1,579,037
First 6 mos. 1942	270	182	2	86	2,332,236
Difference	100	89	4	15	753,199

Continuous BLENDING, DYEING, LEADING AND GUM INHIBITING UNDER LINE PRESSURE

Save time and equipment with %Proportioneers% Treet-O-Control System for blending and treating.



a **TREET-O-CONTROL METER** accurately measures gasoline, (FLUID 1) to be blended.

b **VOL-U-METER,** governed by pilot valve on Treet-O-Control Meter, automatically proportions Alkylate (FLUID 2).

c **VOL-U-METER,** governed by pilot valve on Treet-O-Control Meter, discharges dye (FLUID 3) into gasoline being blended.

d **TREET-O-UNIT,** also governed by Treet-O-Control Meter, injects gum inhibitor (FLUID 4).

TREET-O-CONTROL blends "on stream" in the lines supplying storage tanks or loading racks and replaces older methods of mixing by recirculation or mechanical means. Saves by eliminating evaporation due to extra handling, lowers pumping costs and releases tankage.

Finished product to storage or loading. Other applications include fuel oils, lubricating oils, asphalt cutbacks, acid treating, etc.

% PROPORTIONEERS, INC. %

37 CODDING ST., PROVIDENCE, R. I.

deep zones. About 15 wells already have been completed in the field, going to 10,000 ft. or lower, to tap rich distillate sands. The Miocene series is the payoff in the Erath field, which was opened in 1940. Most of the wells drilled are said to have more than 100 ft. of sand capable of production.

Opening of the Bear field, in Beauregard Parish, last April, third pool discovered in that parish, established a new Frio sand zone. The strike attracted particularly favorable attention because the productive zone is at moderate depth. The discovery, General Crude Oil Co. 1 Baldwin, got 151 bbl. daily yield of 40.5-gravity oil in the 6,500-ft. level. The second well in the field, Phillips 1 First National Bank of Beaumont, completed in June, was a better well than the discovery, its initial being 348 bbl. daily.

Miocene production was established on the east flank of the Napoleonville dome, in Assumption Parish, by George H. Echols and Tide Water in January, with initial yield of 192 bbl. There were no further completions during the rest of the half year. Three earlier deep-flank wells have been abandoned.

Perkins

Ranking in importance with new field discoveries was the strike made in June by E. R. Brann in the old Perkins field, Calcasieu Parish, where his 1 Edgewood Land & Logging Co., Ltd., found production of 165 bbl. of oil daily. This field, opened in 1939, never acquired commercial rating and was abandoned 2 years later. A little gas and distillate were recovered. Observers say that the Brann well, fifth completed in the area, has converted a noncommercial gas field into an oil field with excellent prospects.

Watched with interest as the half year closed was a well in the Bayou des Glaise field, Iberia Parish, where it was predicted a transformation like that at Perkins might be witnessed. Humble, which opened the field 2 years ago, operated it until production dwindled to such a point that it no longer was profitable. That company at midyear had staked location for 4 Wilberts Mineral Corp. B in the abandoned field, and it was planned to drill a 10,000-ft. test.

In the Bully Camp gas field, opened last November in La Fourche Parish by Gulf Refining Co. with initial production of 750,000 cu. ft., four more wells were drilled in 1943, and all were dry holes.

PRODUCTION—LOUISIANA GULF COAST

(In thousands of barrels)

NEW ORLEANS DISTRICT

	Prod. first 6 months 1943			No. wells July 1, 1943
	Crude	Condensate	Total	
Barataria	550	7	557	21
Darrow	214	.....	214	21
De la Croix Island	56	.....	56	3
Delta Farms	376	.....	376	12
Garden Island Bay	595	.....	595	35
Grand Bay	1,171	.....	1,171	37
Lafitte	2,210	.....	2,210	60
Lake Salvador	445	.....	445	17
Lake Washington	72	.....	72	7
La Place	.....	39	39	3
Potash	355	.....	355	15
Quarantine Bay	1,245	.....	1,245	40
St. Gabriel	827	.....	827	25
Stella	118	.....	118	8
University	1,504	27	1,531	80
Venice	929	.....	929	26
Westwego	54	.....	54	4
West Bay	386	.....	386	15
Miscellaneous	64	.....	64	13
Total	11,171	73	11,244	442

HOUMA DISTRICT

Bay Ste. Elaine	64	.....	64	10
Bayou Blue	407	.....	407	33
Bayou Choctaw	89	.....	89	19
Bayou des Allemands	149	8	157	12
Caillou Island	934	.....	934	49
Chacahoula	437	1	438	18
De Large	.....	53	53	1
Dog Lake	210	.....	210	9
Gibson and Northeast	1,032	38	1,070	32
Golden Meadow	1,928	2	1,930	179
La Fourche Crossing	8	52	60	7
Lake Barre	78	.....	78	22
Lake Long	258	141	399	18
Lake Pelto	149	.....	149	14
La Pice	61	6	67	4
Leeville	619	.....	619	73
Lirette	.....	77	77	6
Paradis	2,051	.....	2,051	52
Port Allen	90	.....	90	4
Raceland	379	3	382	15
South Houma	42	.....	42	2
Valentine	68	.....	68	19
West Lake Verret	438	.....	438	25
White Castle	516	.....	516	20
Miscellaneous	59	1	60	7
Total	10,066	382	10,448	650

LAFAYETTE DISTRICT

Anse La Butte	1,055	.....	1,055	62
Bateman Lake	48	120	168	9
Bayou Mallett	41	.....	41	5
Bayou Pigeon	82	.....	82	4
Bayou Sale	758	.....	758	25
Bosco	544	.....	544	37
Charenton	566	.....	566	139
Cheneyville	401	6	407	29
Eola	1,527	3	1,530	92
Erath	103	25	128	14
Fausse Pointe	62	5	67	4
Gueydan	603	13	616	24
Happytown	73	.....	73	2
Horseshoe Bayou	226	1	227	6
Iberia	1,260	.....	1,260	79
Jeanerette	314	.....	314	19
Jefferson Island	167	.....	167	10
Lake Chicot	252	.....	252	10
North Crowley	840	8	848	37
Pine Prairie	645	.....	645	35
Plumb Bob	46	.....	46	3
Port Barre	599	10	609	48
Richie	122	.....	122	12
Tepetate	462	.....	462	46
Vermilion Bay	80	.....	80	3
Ville Platte	2,379	.....	2,379	195
West Cote Blanche	310	2	312	15
West Gueydan	109	.....	109	8
White Lake	229	1	230	8
Miscellaneous	110	76	186	32
Total	14,013	270	14,283	1,014

LAKE CHARLES DISTRICT

Bancroft	119	2	121	26
Black Bayou	564	.....	564	23
Cameron Meadows	357	.....	357	35
Chalkley	757	1	758	28
Creole	117	.....	117	8
East Hackberry	820	.....	820	56
Gillis	261	4	265	38
Grand Lake	495	.....	495	22
Iowa	1,377	3	1,380	64
Jennings	1,825	2	1,827	121
Lake Arthur	.....	63	63	9
Lockport	128	.....	128	20
Neale	617	.....	617	24
Roanoke	292	12	304	18
South Jennings	.....	38	38	1
Starks	101	.....	101	25
Sulphur	364	.....	364	64
Sweet Lake	312	.....	312	17
Vinton	224	.....	224	64
West Hackberry	929	1	930	79
Woodlawn	412	64	476	25
Miscellaneous	48	14	62	35
Total	10,119	204	10,323	803
Total Louisiana Gulf	45,369	929	46,298	2,909

Discoveries in Mississippi and Caddo Lime Maintain Production

by Harry F. Simons

ADDITIONAL pays in existing fields and new discoveries occupied the interest of North Central Texas operators during the first half of 1943. The favorable market position of the area was the cause of a wildcatting campaign comparable to that conducted during the first half of 1942 with 125 exploratory tests being completed. Of these 15 discovered new pools. The deeper and shallower horizons in known fields resulted in the discovery of eight new pays.

Drilling for the half year resulted in 433 wells being completed with only 179 oil wells. The drilling in known areas was widely scattered with no field enjoying extensive development. A number of pools added three and four wells. The Thornberry field, which includes several lenticular sand pools, showed the greatest concentration of drilling and the poorest results with 46 completions, of which 14 were oil wells. The Electra pool had 11 completions, only four of which were oil wells; K.M.A. showed 10 completions, all of them successful; and the K.M.A. - Ellenburger showed 7 oil wells out of 9 completions.

Phillips Petroleum 1 Luke, 4 miles north of Archer City, was the best wildcat completion during the 6-month period. The well was completed in May in the Caddo lime at 4,881-91 ft., for a potential of 763 bbl., flowing. So far no additional tests in the vicinity are active.

Discovery of the Buffalo Springs pool in Clay County by the Continental Oil Co. 1 T. J. Stephens, 2 miles north of Buffalo Springs, helped to set off a burst of activity in that area. The discovery well produced from Mississippi lime at 6,011-49 ft. with a potential of 483 bbl. of 48.6 gravity. One well is offsetting the discovery and several wildcats have started in the vicinity.

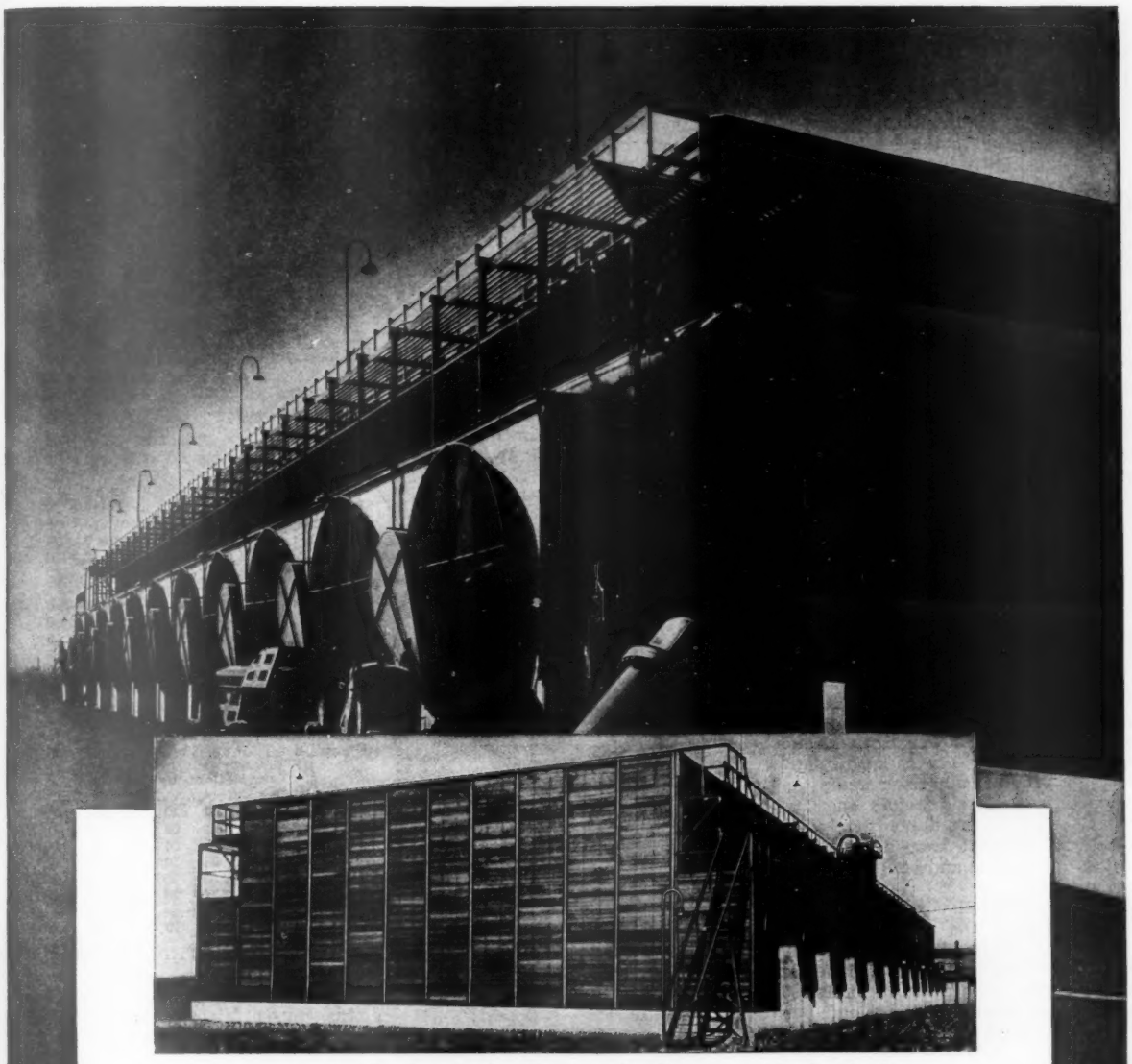
The Ellis pool in Jack County, a Caddo lime pool discovered in January, had two additional oil wells completed during the balance of the

PRODUCTION—NORTH TEXAS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Archer County:				
Caddo	53	87	18	22
Hull-Silk	1,808	1,907	422	420
Kadane	116	110	24	24
Mankins	99	94	14	14
Scotland	181	97	27	17
Miscellaneous	1,379	1,536	3,324	3,406
Total	3,636	3,833	3,819	3,903
Baylor County:				
Rendham	39	42	13	13
Seymour	169	176	30	32
Miscellaneous	65	121	126	127
Total	273	399	169	172
Clay County:				
Antelope	295	176	54	53
Halsell	80	73	11	11
Joy	79	46	7	3
New York City	64	59	9	9
Russ	67	61	20	14
Watson	42	16	12	1
Miscellaneous	586	691	914	885
Total	1,213	1,122	1,027	976
Cooke County:				
Voth	61	84	57	60
Walnut Bend	850	543	139	126
Miscellaneous	635	746	984	1,000
Total	1,547	1,374	1,180	1,186
Wilbarger County:				
Consolidated	117	143	38	37
Fargo	576	320	48	46
Harrold	47	38	13	8
Rock Crossing	122	111	36	35
Miscellaneous	1,035	1,138	1,535	1,577
Total	1,897	1,750	1,670	1,705
Foard County	39	46	15	16
Jack County:				
East Bryson	403	468	153	153
Hoefle	109	55	18	6
Miscellaneous	425	461	580	587
Total	937	984	751	746
Montague County:				
Bonita	134	107	21	20
Bowers	170	168	33	31
Forestburg	71	...	6	.....
Hildreth	44	...	3	.....
Ringgold	142	110	15	12
Rogers & Rogers	202	224	48	47
Saunders	43	.....	4	.....
Miscellaneous	808	863	965	933
Total	1,614	1,472	1,095	1,043
Wichita County:				
Burkburnett	759	916	(*)	(*)
Electra	1,012	1,384	(*)	(*)
K.M.A.	5,448	5,421	1,772	1,722
Miscellaneous	150	97	5,456	5,687
Total	7,369	7,718	7,228	7,409
Young County:				
Burns-Ragland	61	14	5	4
James	73	90	47	50
Knight	44	147	29	30
Knox	148	128	51	41
Lupton-McLester	40	44	23	21
Padgitt	50	.....	3	.....
Sewell	113	120	40	43
Miscellaneous	1,208	1,277	2,218	2,235
Total	1,737	1,820	2,416	2,426
Total North Texas	20,262	20,458	19,370	19,522

*In miscellaneous.



Low pumping head, multiple cell type with cells arranged back-to-back.

This Heavy Duty Double Forced Draft Cooling Tower cools 41,800 gallons of water per minute. It is equipped with twenty-two 12 foot diameter, adjustable pitch propeller type fans, driven through "V" belt drives by 25 horsepower motors. It is structurally designed with our patented timber connectors to withstand a wind velocity of 125 miles per hour.

WATER COOLING EQUIPMENT CORPORATION

New Hampshire and Georgia Street **Affton Station, St. Louis, Missouri**

first half of the year. Potential of the three wells is 1,260 bbl. and there are two additional tests being drilled.

The Peek pool in Jack County was discovered in the latter part of May and as yet no additional development has started due to the leases in the area being tightly held. The pool was discovered by the Standard of Texas and Hanlon-Buchanan 1 R. B. Peek, Section 3304, T.E.&L. Survey, 5 miles northeast of Jermyn, which flowed 520 bbl. from Caddo lime, 4,575-89 ft.

Other discoveries did not show a large potential and were more or less of secondary importance.

The Walnut Bend pool in Cooke County had an extension and a deeper pay in the lower Strawn sand. The old pool produces from the upper Strawn sand. Nine wells, embracing 480 acres, were added to the field as the result of the discovery. The extension well, Sinclair Prairie 1 W. E. Winger, NW cor. Lot 70, Fannin County School Land, produced 880 bbl. on potential test. At the end of June four wells were currently active.

A new pay in the Hildreth pool in Montague County stimulated activity there. The discovery well was the Continental Oil Co. 1-A Jack Hildreth, Section 57, E.T.R.R. Co. Survey, which produced 4,504 bbl. on potential test from lower Strawn and upper Bend pay. The Simpson sand was the producing horizon being developed in the field before the discovery of oil in the upper zone. Two additional wells have been completed in the upper zone and one is currently drilling.

The largest well completed in the district during the 6-month period was in the Joy pool in Clay County when the Consolidated Oil Co. 1 Viola Myers registered a potential of 12,096 bbl. per day from Mississippi lime pay at 5,985 ft., total depth 6,063. The well also extended the Joy pool ½ mile to the north. This well is 6 miles from the Buffalo Springs discovery and coupled with it acted as a stimulant in the drilling campaign for Mississippi lime production in Clay County.

None of the other new pays were of particular importance except as they affect the economic possibilities of the pools in which they occurred.

Wildcatting will probably proceed during the balance of the year at the pace assumed during the first 6 months, which is slightly under last year. It will probably be more important than the field development which for the most part will be concentrated on outlining the recently discovered pools. At the present time there is no single outstanding pool awaiting development in the area and drilling will consequently be rather scattered.

NORTH TEXAS

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Allar-Hunt	6	4	1,580	2	0
Antelope	2	1	55	0	1
Bindel	2	1	970	0	1
Bowers	3	1	350	0	2
Briar Creek	2	1	92	0	1
Browning	1	1	74	0	0
Bunger	1	1	17	0	0
Burkburnet shallow	5	0	0	0	5
Burns-Ragland	2	1	3,364	0	1
Buttram	1	1	19	0	0
Consolidated-Ellenburger	2	2	1,287	0	0
Cooper	3	2	421	0	1
Davenport	4	3	192	0	1
East Bryson	3	2	177	0	1
Electra	11	4	71	0	7
Eliasville	1	1	66	0	0
Ellis	2	2	744	0	0
Fargo	3	3	308	0	0
Farmer	3	3	21	0	0
Ferguson	3	3	316	0	0
Fish Creek	2	2	279	0	0
Garvey	1	1	447	0	0
Halsell	2	2	58	0	0
Harrison and Allen	3	1	43	0	2
Harrold	5	4	622	0	1
Hildreth	2	2	7,894	0	0
Hoefle	8	7	1,683	0	1
Hull-Silk Caddo	3	3	913	0	0
Illinois Bend	2	1	204	0	1
Joy	2	2	211	0	0
Joy Mississippi	1	1	12,096	0	0
K.M.A. Elelnburger	9	7	3,737	0	2
K.M.A.	10	10	3,962	0	0
Knox Mississippi	3	2	2,854	0	1
Lido	1	1	1,224	0	0
Loving	1	1	9	0	0
Lupton and McLester	2	2	90	0	0
Markley	2	2	20	0	0
Mueller	1	1	341	0	0
Muenster	3	0	0	0	3
Murray	2	1	789	0	1
Myers	2	1	66	0	1
North Knox	3	1	706	1	1
Olney	3	0	0	0	3
Parrott	1	1	20	0	0
Rendham	2	1	51	0	1
Ringgold	1	1	25	0	0
Rock Crossing	3	2	30	0	1
Rogers & Rogers	3	2	2,092	0	1
Ross	2	2	201	0	0
Scotland	8	6	1,809	0	2
Sewell	4	1	15	0	3
Stoneburg	2	2	484	0	0
Swastika	6	2	20	0	4
Talbot	2	1	35	0	1
Thornberry	46	14	533	0	32
Vogtsberger	5	4	2,264	0	1
Walnut Bend	8	8	10,140	0	0
Watson	9	6	645	0	3
Wear	1	1	0	0	1
Wilson	1	1	12	0	0
Williamson	1	1	95	0	0
Misc. counties:					
Archer	16	7	66	0	9
Clay	4	0	0	0	4
Cooke	1	0	0	0	1
Jack	6	0	0	0	6
Wichita	12	3	80	0	9
Wilbarger	4	3	83	0	1
Young	5	0	0	0	5
Wildcats	125	19	2,927	0	106
Miscellaneous	22	0	0	0	22
Total	433	179	70,004	3	251

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	67	30	0	37	220,566
February	52	23	0	29	133,784
March	68	34	0	34	204,855
April	83	34	1	48	211,204
May	93	35	1	56	287,747
June	71	23	1	47	196,454
First 6 mos 1943	433	179	3	251	1,254,610

WEST CENTRAL TEXAS

Relaxation of the spacing restrictions in the shallow pay horizons, plus a fairly active wildcatting campaign sustained interest in the

PRODUCTION—WEST CENTRAL TEXAS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Brown County	216	250	844	849
Callahan County	127	155	1,098	1,168
Coleman County:				
Coker	38	.....	10	1
Novice and North	98	151	48	46
Silver Valley	43	48	12	9
Miscellaneous	163	190	339	340
Total	342	389	409	396
Comanche County	46	36	57	58
Eastland County	426	391	373	435
Erath County	11	13	14	11
Fisher County:				
Rotan	51	59	29	33
Royston	171	201	97	104
Miscellaneous	25	34	9	9
Total	247	294	135	146
Haskell County	8	9	11	10
Jones County:				
Akard	54	57	28	25
Avoca district	251	239	64	64
Griffin	230	244	66	65
Hawley	47	57	63	63
Lewis-Steffins	108	237	186	190
Sayles	131	149	79	79
Wimberly	143	75	46	26
Miscellaneous	220	238	208	198
Total	1,184	1,296	742	710
Palo Pinto County	45	49	45	131
Runnels County	19	38	10	5
Shackelford County:				
Ivy	168	187	82	80
Nail	44	37	17	16
Miscellaneous	660	657	1,917	2,004
Total	872	881	2,016	2,100
Stephens County	566	475	611	613
Stonewall County	18	14	5	5
Taylor County:				
Reddin	39	.....	4	.....
Miscellaneous	86	82	47	31
Total	125	82	51	31
Throckmorton County	97	152	243	252
Wise County	1	.....	1	.....
Total West Cent. Texas	4,350	4,524	6,665	6,925

West Central Texas area during the first half of 1943. There were 50 wildcats completed in the area during the 6-month period of which four were successful. There were 161 total completions but only 43 of the 111 tests drilled in proven areas were successful.

Most important successful wildcat was the discovery of Mississippi lime production in the Eliasville pool in Stephens County. It flowed at the rate of 4,284 bbl. from 6 ft. of Mississippi lime pay at 4,236 ft., total depth. The oil was 44° gravity. Two additional oil wells have been completed to the Mississippi pay in the field.

The discovery in June of Marble Falls (or Lake sand) production on the Corbett ranch in northeastern Stephens County opened up a new field and added interest to the area. A second well is currently drilling in the pool. The discovery well flowed 840 bbl. of oil from approximately 20 ft. of pay topped at 3,938 ft.

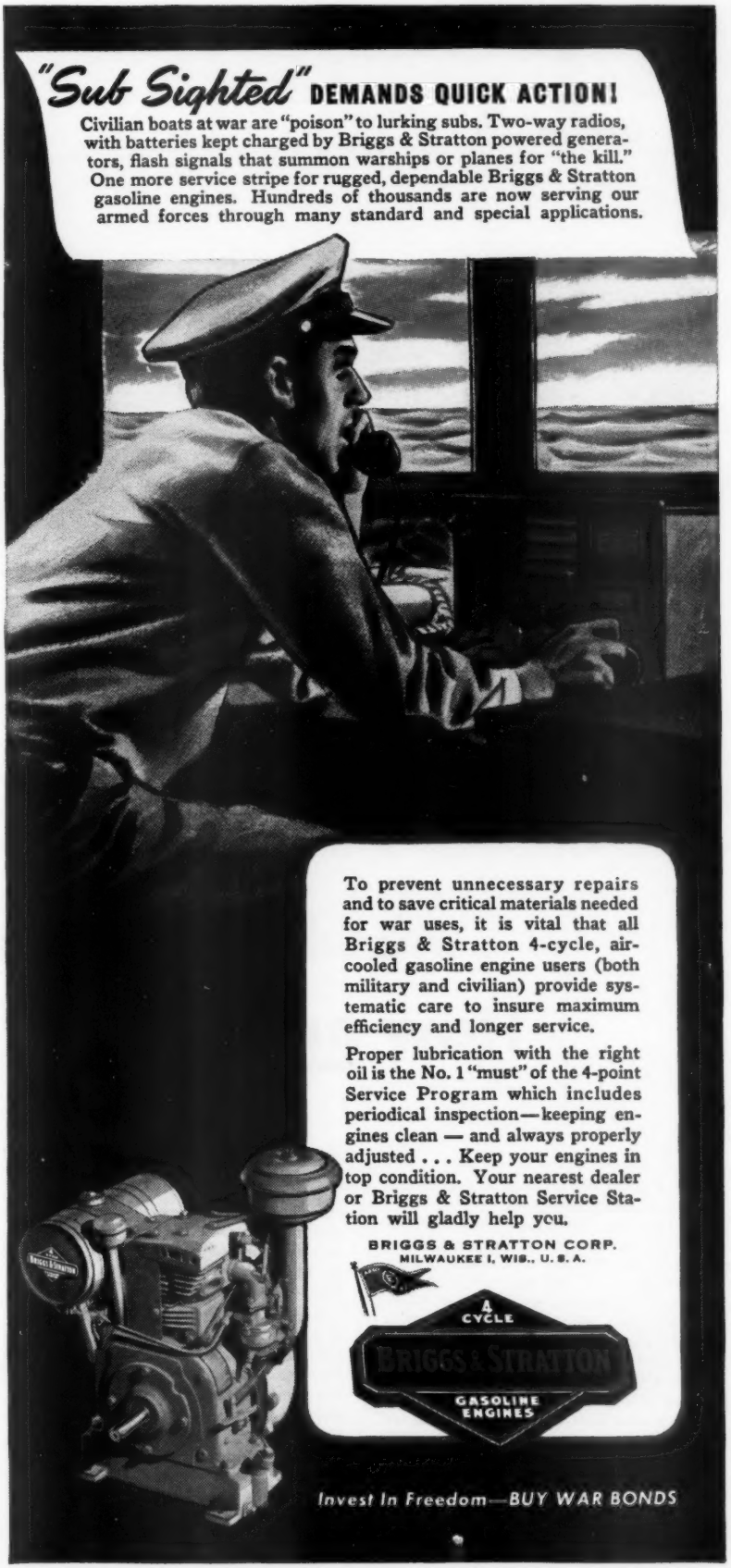
The Patterson pool in Jones County got production in the Tannehill sand and a second test is currently drilling. The discovery well, the Fain-McGaha 1 Patterson, produced 123 bbl. of 37° gravity oil on the pump. The field has possibilities of producing from the sands in the Cisco series which are exploited in the Wimberly pool. The 728 acres immediately around the well are unitized.

WEST CENTRAL TEXAS
Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Avoca	3	1	56	0	2
Allen and Ritchie	1	0	0	1	0
Bluff Creek	8	8	554	0	0
Coker	3	3	328	0	0
Cook	5	1	50	0	4
Eliasville	3	2	5,316	0	1
Lee Ray	1	1	43	0	0
Loving	1	1	100	0	0
Morris	2	1	2	0	1
Merkel	5	2	242	0	3
Nail	4	4	261	0	0
Newell	1	1	5	0	0
Reddin	2	1	1,320	0	1
Rock Crusher	4	2	18	0	2
Sandy Ridge	1	1	200	0	0
Santa Ana	2	0	0	2	0
Smith-Morgan	1	1	12	0	0
South Noodle	5	4	765	0	1
Stith	3	1	555	0	2
Strand	6	3	2,331	0	3
Strawn	4	0	0	1	3
View	2	1	125	0	1
Wimberly	9	4	2,286	0	5
Misc. counties:					
Brown	2	0	0	2	0
Callahan	1	0	0	0	1
Comanche	1	0	0	0	1
Eastland	4	0	0	1	3
Palo Pinto	2	0	0	1	1
Shackelford	4	0	0	0	4
Stephens	1	0	0	0	1
Wildcats	50	4	1,010	1	45
Miscellaneous	20	0	0	0	20
Total	161	47	14,569	9	105

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	25	7	2	16	70,639
February	25	8	3	14	55,112
March	30	6	1	22	66,854
April	25	5	1	19	57,726
May	35	12	1	22	80,903
June	21	9	0	12	58,323
First 6 mos 1943	161	47	9	105	389,557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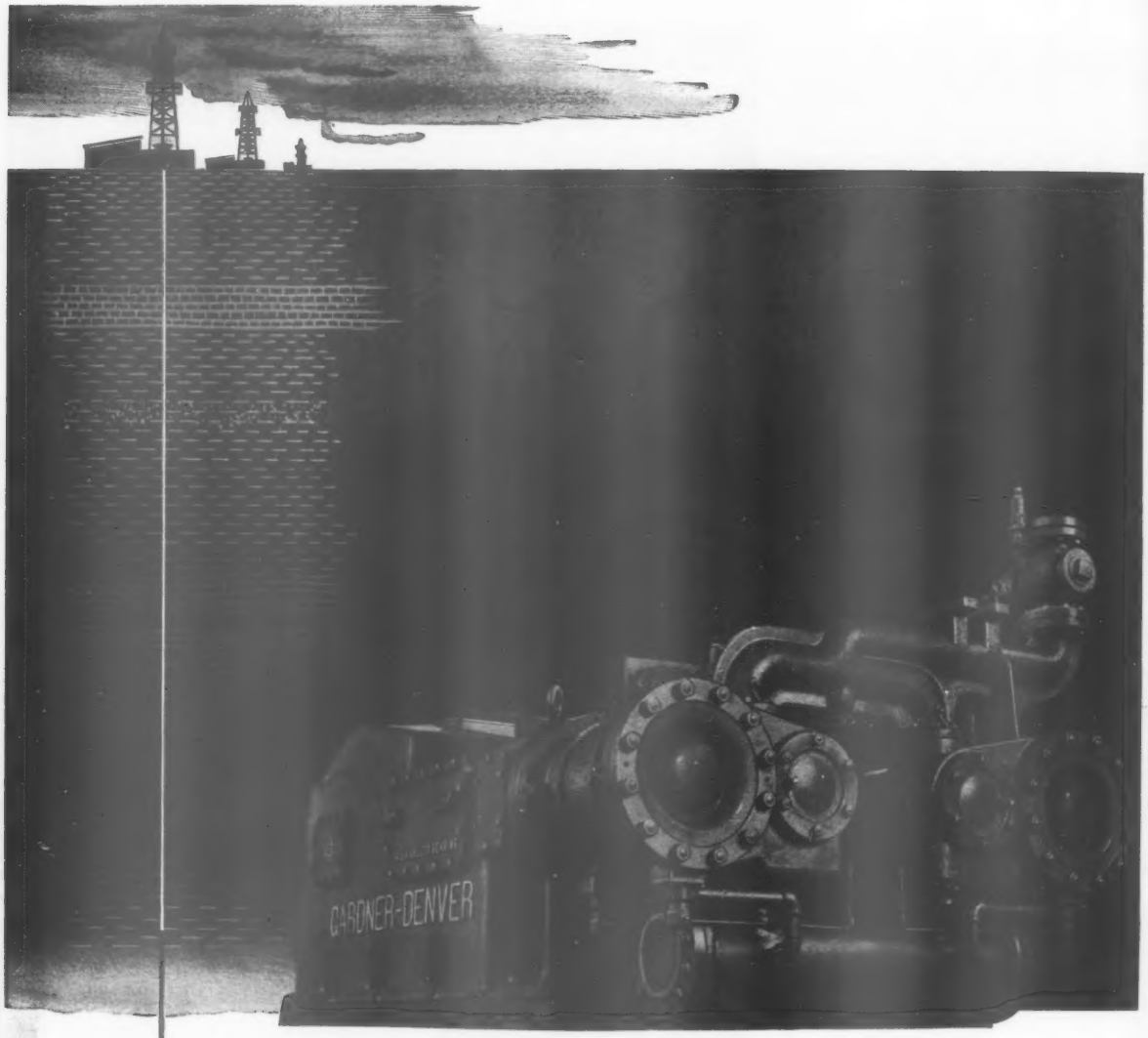

HOW DEEP CAN A "DEEP WELL" BE?

IT'S a good question—but the answer is constantly changing.

In 1909, an oil well was deep at 5,000 feet. In the late '20s, "deep wells" of 8,000 and 9,000 feet were a world wonder. Today, oil field engineers drill to depths of 11,000-12,000—even 15,000 feet.

What has made these tremendous depths possible? *Improved equipment*—such as the Gardner-Denver 14 x 14 Twin Cylinder Steam Drilling Engine shown above.

It's a stout-hearted machine, designed to stand racking shocks and strains that would quickly pound ordinary equipment to pieces. From its rugged one-piece power frame to its heavy-duty, roller-bearing crankshaft, it is built *tough*—for one of the world's toughest jobs.

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Here is plenty of power to drill the deepest holes and handle the largest string of drill pipe. Yet that power is under perfect control—thanks to Gardner-Denver engineering.

For the valve gear of the 14 x 14 engine is a model of simple design, construction, adjustment and operation. And with this simplicity goes exceptional economy, because the valve gear is *adjustable* to suit varying power requirements.

With equipment like this, Gardner-Denver has established a world-wide reputation for *design-ability* in heavy machinery . . . a reputation for anticipating industry's needs.

For complete specifications, write Gardner-Denver Company, Quincy, Illinois • Dallas • Houston Tulsa • St. Louis • Los Angeles • San Francisco New York • Chicago • Pittsburgh • Continental Supply Co., Continental Building, Dallas, Texas Republic Supply Company (of California), 2122 East 7th Street, Los Angeles, California.

GARDNER-DENVER

Since 1859

Rapid Development of Carmi Field Opens Important Area on South Flank of Arch

by Carl Hoot

THE outstanding development in the northern Mid-Continent area during the first 6 months of this year is the rapid expansion of the Carmi pool of Pratt County. Although Carmi was discovered the latter part of 1942 by Hollow Drilling Co. 1-B Brown in 29-26-12w, the first well was not completed until February 1943. About 2 weeks later, Skelly Oil Co. 1-B Knop in 25-26-13w, 1½ miles directly west of the Brown well, found prolific pay in the Arbuckle. This discovery was called North Iuka but drilling, which was well under way by April, spread rapidly until the two areas were joined and called Carmi. At present the field is nearly 3 miles long, with some 2,000 acres proven up. To date there have been no dry holes reported and the average initial potential is 2,800 bbl., actual test, in the Arbuckle from 4,305-29 ft.

Completions in Kansas for the first half of 1943 were up 6 per cent over the same period last year but the number of oil wells was down 4 per cent. The increase in the number of wildcats drilled and discoveries present a more encouraging picture. There were 217 wildcat wells completed in 1943, compared with 148 last year, a gain of 46.6 per cent. The 35 discoveries this year, including 5 extensions or new pays, were 118 per cent over the 16 successful wildcats reported in 1942.

The majority of the exploratory wells followed the Barton arch as they have over the past 3 years and discoveries were within 3 to 5 miles of proven areas. Opening of the Stud-

PRODUCTION—KANSAS

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Barber County:				
Lake City	17	11	3	2
Sun City	28	10	2	2
Whelan	106	93	18	18
Miscellaneous	2	.....	3	.....
Total	153	114	26	22
Barton County:				
Ainsworth, North and East	273	313	62	77
Beaver-Feltes	281	231	52	49
Beaver and North	*150*	*84*	*38*	*36*
Feltes	*131*	*147*	*14*	*13*
Bloomer-Breford	1,629	1,267	253	252
Bloomer	*1,463*	*1,133*	*225*	*223*
Breford	*166*	*134*	*28*	*29*
Kraft-Prusa	2,287	1,088	293	211
Lanterman and Southeast	63	63	12	10
Silica-Raymond	5,166	3,994	903	863
Silica	*4,581*	*3,598*	*765*	*781*
Raymond	*449*	*319*	*67*	*65*
Wenke and West	*63*	*56*	*10*	*11*
Hagen	*20*	*9*	*4*	*3*
Marchand	*53*	*12*	*8*	*4*
Miscellaneous	134	174	49	31
Total	9,833	7,130	1,624	1,493
Clark County:				
Morrison	3	5	1	1
Ellsworth County:				
Lorraine	195	230	86	84
Stoltenberg-Wilkins	1,622	1,257	247	233
Heiken	*10*	*6*	*2*	*5*
Stoltenberg	*1,114*	*881*	*179*	*155*
Wilkins	*498*	*370*	*66*	*63*
Miscellaneous	3	0	4	0
Total	1,820	1,487	337	317
Ellis County:				
Bemis-Walters	3,557	2,676	498	487
Bemis-Shutts	*3,049*	*2,291*	*429*	*415*
Koblitz	*50*	*38*	*8*	*8*
Marshall	*168*	*117*	*24*	*22*
Walters	*290*	*230*	*37*	*42*
Blue Hill	98	83	22	20
Burnett and South	2,728	1,606	209	208
Miscellaneous	145	144	50	40
Total	6,528	4,509	779	755
Finney County:				
Nunn	15	17	2	2
Graham County:				
Morel	260	105	19	8
Miscellaneous	8	14	3	2
Total	268	119	22	10
Harvey County:				
Halstead	38	52	11	18
Hollow-Nikkel	146	178	74	56
Sperling	27	24	6	7
Total	211	254	91	81
Kearny County:				
Patterson	23	12	3	2
Kingman County:				
Cunningham	333	353	85	80
McPherson County:				
Bornholdt-Welch	985	867	176	181
Bornholdt and East	*952*	*822*	*147*	*151*
Welch and East	*33*	*45*	*29*	*30*
Crowther	80	.....	11	.....
Graber-Hesston	336	494	115	130
Henne	111	43	14	11
Johnson	53	45	5	14
Lindsborg	409	29	77	10
Ritz-Canton	500	603	243	231
Roxbury and South	285	187	40	37
Voshell	306	283	82	87
Miscellaneous	71	79	56	58
Total	3,136	2,630	819	759
Ness County:				
Aldrich	61	77	12	12
Pawnee County:				
Pawnee Rock and East	191	145	25	28
Zook	1	2	2	2
Total	192	147	27	30

(Continued on Page 181)

ley pool, first production for Sheridan County, by Union Oil Co. of California 1 Pratt Ranch, NW NE SW 23-8-26w, was one exception. This well was 12 miles from the nearest production, the Penokee pool, and 36 miles from the Ray pool in Phillips County, nearest major field. The Pratt well pumped 689 bbl. of oil from Lansing-Kansas City lime at 3,808-17 ft.

Another discovery off the Barton arch play was in Barber County, northwest of the Medicine Lodge oil and gas pool. This was opened by Champlin Refining Co. 1 Allen, SE NW SE 22-32-15w, and called Deerhead. The well made one of the largest potentials this year, having an actual flowing record of 2,785 bbl. in 24 hours. Producing zone is the Viola lime at 5,005-14 ft. East of the Allen well, 1½ miles, Champlin's second test was dry at 5,303 ft.

Saline County

Saline County was brought back into the list of producing counties by two discoveries. In February, Deep Rock Oil Corp. 1 Hunter, NE NW SW 20-16-1w, opened the Hunter pool by pumping 152 bbl. of oil in 8 hours. Pay zone is the Mississippian chat at 2,674 ft. Location is in the southeastern corner of the county and about 6 miles north of the Roxbury chat pool. Two offset producers have since been drilled.

The second discovery was in April. Westgate-Greenland 1 Sudendorf, NW NW SE 30-14-2w, just southeast of the town of Salina, pumped 124 bbl. in Viola lime at 3,222-32 ft. One dry offset has been drilled.

One of the major developments of the year was the joining of the Peace Creek and Zenith pools of Reno and Stafford counties. Completions at Peace Creek, last year's most active pool, tapered off the first half of 1943 but the boundaries were steadily expanded. Drilling of edge wells in the Zenith pool increased steadily the first half of the year and in addition to important extensions to the north and west, the gap separating it from Peace Creek was entirely closed. Since both areas produce from the same Viola lime horizons, action is forthcoming by the Kansas Corporation Commission to officially join the two pools and prorate them as one.

This structure, lying in a northeast-southwest trend, is now a continuous producing field 15 miles long and the limits have not yet been proved. There are no dry holes at the north end of Peace Creek and extension wells all along the eastern border, now as much as 1 mile east of failures which were previously thought to be defining wells, are showing for more oil than those in the main body. A comparison of production for the first 6 months of 1943 and 1942 shows Peace Creek up from 299,000 bbl. to 1,756,000 bbl. this year and Zenith up from 1,743,000 bbl. to 1,926,000 bbl. this year.

The present outlook in Kansas is for a continued increase in drilling, both in field wells and exploration. Kansas completions have shown a steady increase since the first of the year, from 100 wells in January to 160 in June. Drilling wells at the end of June were up 20 per cent in comparison with the number drilling at the end of January.

KANSAS

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Ainsworth	3	1	491	0	2
Barry	2	1	120	0	1
Beaumont	4	2	105	0	2
Bemis-Shutts	11	6	5,024	0	5
Bloomer	3	2	299	0	1
Burrton	1	1	200	0	0
Carmi	23	23	7,030	0	0
Chase	20	16	4,803	0	4
Couch	2	1	401	0	1
Crowther	5	5	4,771	0	0
Cunningham	3	3	1,356	0	0
Curtis	2	1	341	0	1
Dayton	4	4	830	0	0
Deerhead	1	0	0	0	1
Deichman	3	1	978	0	2
Drach	13	11	8,384	0	2
Dunn's Mill	2	0	0	0	2
Eberhardt	3	2	1,366	0	1
Eldorado	12	11	524	0	1
Ellis	3	3	1,503	0	0
Forest Hill	5	3	1,015	0	2
Frisbie	1	0	0	0	1
Frog Hollow	1	0	0	0	1
Geneseo	1	0	0	0	1
Gorham	3	3	868	0	0
Greenvale	10	8	2,405	0	2
Hall-Gurney	16	13	4,596	0	3
Hazel	1	0	0	0	1
Henne	3	1	300	0	2
Hunter	3	3	214	0	0
Iuka	9	4	392	0	5
Karber	2	1	324	0	1
Keesling	6	3	1,161	0	3
Kraft-Prusa	47	32	12,576	0	15
Lake City	1	1	201	0	0
Lantermann	1	1	50	0	0
Laton	5	5	1,036	0	0
Lindsborg	33	32	13,094	0	1
Lost Springs	22	13	1,867	0	9
McLouth	26	12	668	4	10
Merten	2	1	133	0	1
Morel	9	5	7,156	0	4
Peace Creek	13	12	2,433	0	1
Ray and SE	5	4	2,111	0	1
Raymond	2	2	821	0	0
Roesler	1	0	0	0	1
Roxbury and S	2	0	0	0	2
Saline	1	0	0	0	1
Silica	18	10	6,570	0	8
Smyres	2	2	550	0	0
Stafford	2	1	640	0	1
Stoltenberg	14	11	2,990	0	3
Trapp	15	11	4,584	0	4
Valley Center	2	2	180	0	0
Vaughn	1	1	903	0	0
Virgil	6	5	118	0	1
Wilkins and SE	4	1	256	0	3
Witt	9	9	4,391	0	0
Zenith	23	21	6,600	0	2
Misc. counties:					
Butler	12	6	164	0	6
Greenwood	3	2	34	0	1
Wildcats	217	35	16,331	0	182
Others	89	28	5,125	5	56
Total	768	398	141,383	9	361

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Barber	7	3	2,999	0	4
Barton	21	6	1,002	0	15
Brown	1	0	0	0	1
Butler	6	2	50	0	4
Cowley	6	0	0	0	6
Decatur	3	0	0	0	3
Dickinson	2	0	0	0	2
Edwards	8	0	0	0	8
Ellis	14	3	500	0	11
Ellsworth	3	1	196	0	2
Graham	3	0	0	0	3
Greely	1	0	0	0	1
Greenwood	1	0	0	0	1
Harvey	2	0	0	0	2
Jefferson	1	0	0	0	1
Kingman	1	0	0	0	1
Leavenworth	1	0	0	0	1
Marion	4	0	0	0	4
McPherson	19	0	0	0	19
Mitchell	2	0	0	0	2
Norton	1	0	0	0	1
Osborne	2	0	0	0	2
Pawnee	2	0	0	0	2
Phillips	8	3	2,081	0	5
Pratt	10	4	5,390	0	6
Reno	11	0	0	0	11
Rice	11	1	78	0	10
Rooks	9	0	0	0	9
Rush	4	0	0	0	4
Russell	14	4	728	0	10
Saline	13	2	276	0	11
Sedgwick	4	0	0	0	4
Sheridan	1	1	689	0	0
Stafford	19	5	2,342	0	14
Wallace	2	0	0	0	2
Total	217	35	16,331	0	182

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	100	49	0	51	334,560
February	102	48	3	51	335,616
March	124	66	3	55	415,694
April	126	63	1	62	424,726
May	156	78	1	77	537,630
June	160	89	1	70	550,254
First half 1943	768	393	9	366	2,598,480
First half 1942	724	410	31	283	2,143,831
Difference	44	17	22	83	454,649

FOREST CITY BASIN

There was little encouragement given operators in this area the first 6 months of the year. Production has shown a steady decline and the hoped-for Bartlesville sand development in Atchison County, Missouri, has faded from the picture.

There were seven dry holes drilled in Missouri and nine in Nebraska for the 6-month period. Nebraska had one oil well completed, the only new producer this year. This was Nebraska Producing & Refining Co. 1 D. E. Bohrer in E½ NW NW 10-1n-14e, Richardson County, which was finished late in June. Ten barrels of oil an hour was swabbed in Hunton lime at 2,170-80 ft.

NEBRASKA

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	1	0	0	1	2,000
March	2	0	0	2	6,303
May	4	0	0	4	11,100
June	2	1	0	1	6,608
First half 1943	9	1	0	8	26,011
First half 1942	17	8	0	9	40,664
Difference	8	7	0	1	14,653

MISSOURI, IOWA

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
March	1	0	0	1	1,454
April	1	0	0	1	560
May	1	0	0	1	1,502
June	2	0	0	2	2,509
First half 1943	5	0	0	5	6,025
First half 1942	9	0	0	9	7,796
Difference	4	0	0	4	1,771

PRODUCTION—KANSAS (Continued)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Norton County:				
Hewitt	6	4	2	1
Phillips County:				
Dayton and Northeast	122	34	25	8
Ray and Southeast	544	230	69	46
Miscellaneous	8	3	3	1
Total	674	267	97	55
Pratt County:				
Carmi	121	.....	40	.....
Iuka	106	32	21	9
Miscellaneous	14	10	7	2
Total	241	42	68	11
Reno County:				
Burrton	892	1,102	162	406
Hilger	207	155	32	32
Peace Creek	1,756	299	141	73
Miscellaneous	74	134	54	52
Total	2,929	1,690	389	563
Rice County:				
Chase-Campbell	1,935	1,569	390	352
Geneseo-Edwards	2,257	1,593	282	285
Geneseo	*1,664*	*1,128*	*193*	*195*
Edwards	*593*	*465*	*89*	*90*
Hafferman	36	36	1	9
Orth and East	65	53	15	13
Smyres	151	17	24	9
Wherry	234	397	187	183
Miscellaneous	129	102	40	32
Total	4,807	3,767	939	883
Rooks County:				
Laton	218	336	37	73
Westhusin	75	60	14	14
Miscellaneous	64	44	20	16
Total	357	440	71	103
Russell County:				
Atherton-Russell	292	306	62	82
Atherton and North	*99*	*87*	*15*	*33*
Russell and North	*193*	*219*	*47*	*50*
Big Creek-Vaughn	490	506	439	113
Big Creek and SE	*319*	*348*	*408*	*85*
Vaughn	*171*	*158*	*31*	*28*
Fairport and North	326	275	145	145
Gorham	1,328	1,376	298	334
Greenvale, North and West	362	228	65	45
Hall-Gurney	1,960	1,988	456	420
Trapp-Sellens	5,651	4,511	915	838
Miscellaneous	150	101	52	34
Total	10,559	9,291	2,432	2,012
Rush County:				
Albert-Otis	249	230	35	37
Albert	*89*	*70*	*17*	*18*
Otis	*160*	*160*	*18*	*19*
Saline County:				
Miscellaneous	11	.....	6	.....
Scott County:				
Shallow Water	50	63	9	9
Sedgwick County:				
Eastboro	65	80	35	35
Goodrich	135	135	31	35
Greenwich	101	119	42	42
Robbins	36	39	29	50
Valley Center and Misc.	144	115	52	65
Total	481	488	189	227
Stafford County:				
Bedford	123	123	21	22
Drach-Fischer-Gates	191	118	43	27
Drach	*104*	*47*	*29*	*13*
Fischer	*17*	*13*	*3*	*3*
Gates	*70*	*58*	*11*	*1*
Jordan	36	47	7	7
Kipp	45	43	11	8
Leesburg	234	63	14	11
Richardson	384	278	59	60
St. John	146	142	25	24
Sittner-Max	200	245	37	35
Sittner and South	*109*	*123*	*20*	*2*
Max-Mueller	*91*	*122*	*17*	*1*
Snider and South	68	53	10	10
Stafford	280	138	22	19
Zenith	1,926	1,743	332	305
Miscellaneous	91	56	22	26
Total	3,724	3,049	603	554

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Sumner County:				
Churchill	63	75	53	53
Oxford and West	43	107	52	60
Padgett	40	32	20	18
Wellington	105	135	50	90
Miscellaneous	102	117	27	28
Total	353	466	202	249
Trego County:				
Miscellaneous	21	23	21	21
Total western Kansas	47,038	36,674	8,856	8,289

EASTERN KANSAS

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Butler County:				
Augusta and South	208	262	240	213
Brandt	62	105	44	43
Elbing	135	149	59	59
Eldorado	1,160	1,286	1,747	1,546
Fox-Bush	65	60	119	158
Haverhill-Kramer	224	232	190	187
Garden-Schaeffer-Reynolds	*90*	*78*	*59*	*57*
Haverhill	*49*	*72*	*68*	*67*
Kramer	*72*	*68*	*35*	*33*
Leon-Weaver	*13*	*14*	*28*	*30*
Keighley-Blankenship	76	128	130	147
Potwin	100	120	96	96
Miscellaneous	100	111	138	108
Total	2,130	2,453	2,763	2,557

SOUTH AND CENTRAL KANSAS

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Coffey County	8	9	28	28
Cowley County:				
Couch	102	87	21	19
David-Sherwood	45	54	23	23
Frog Hollow and East	244	165	48	48
Hittle	424	368	67	75
Rainbow-Gueda	194	168	157	125
Rock and North	59	93	33	41
Weathered	56	74	28	28
Winfield-State	78	86	110	105
Miscellaneous	226	294	185	240
Total	1,428	1,389	672	704
Elk County	79	191	273	258
Greenwood County:				
Ateyo-Teeter-Pixley	348	358	430	430
Beaumont and South	121	157	23	23
Quincy	65	87	101	101
Sallyards	171	173	270	483
Seeley-Wick	343	443	517	620
DeMalorie-Sowder	*144*	*157*	*129*	*129*
Hamilton	*13*	*49*	*47*	*77*
Madison	*76*	*80*	*100*	*100*
Seeley-Wick	*110*	*157*	*241*	*314*
Virgil & Dunaway	218	282	499	484
Winterscheid	85	96	237	227
Miscellaneous	292	261	476	355
Total	1,643	1,857	2,553	2,723
Jefferson and Leavenworth counties:				
McLouth	64	46	16	10
Marion County:				
Lost Springs	323	413	127	116
Miscellaneous	70	90	36	36
Total	393	503	163	152
Eastern counties:				
Neosho Falls	242	267	(*)	(*)
Miscellaneous	1,452	1,392	7,255	6,800
Total eastern Kansas	7,439	8,107	13,759	13,232
Total Kansas	54,477	44,989	22,615	21,516

*Included in miscellaneous.

NEBRASKA

Barada	126	179	15	15
Falls City	285	547	57	56
Miscellaneous	45	11	10	14
Total	456	737	82	85

Discovery Record for Half Year Fails To Offset Production Decline

by Carl Hoot

OKLAHOMA'S declining production was offset very little by discoveries the first half of 1943. The number of wildcats drilled increased 18 over the same period last year but the discoveries were only 2 over that period. Oklahoma operators have been plagued by discoveries, in which the new well made a high potential but offsets contained water. Lake Shawnee and South McComb, both in Pottawatomie County, are such examples. Both discoveries produced some 600 bbl. of oil a day but the first had four offsets containing water and the latter received one producer and three dusters.

On the other hand, Pure Oil Co.'s Oil Creek sand well, adding a fourth pay to the already prolific Cumberland field; Ace Gutowsky's Hunton lime discovery in Oklahoma County, now West Edmond, and the Cromwell sand discovery of Midco Oil Corp. in Okfuskee County all have promise of becoming fields of major importance.

The most recent discovery, Midco Oil Corp. 1 Cradukes, NE NW NE 24-12n-8e, made an actual flowing potential of 2,445 bbl. of oil in 24 hours, the highest reported this year, and present indications are that it will develop into a field the size of Dill, which produces from the same sand trend to the south of it. Although this well is rimmed by dry holes approximately 1 mile to the north, and has several small Hunton gas wells bordering it on the south, there is still an untested area of 3 or 4 square miles in the immediate area of the well and the gap between it and the Dill pool is very promising, according to a number of operators. West of the 1 Cradukes, there are a few 5 and 10-bbl. Cromwell wells that were drilled over the past several years but these are separated from the discovery by a fault running north and south and extending to Dill. To the east of this fault and running parallel with it, is thought to lie the new rich sand zone. On last report the offset wells were not deep enough to reveal any deciding information.

West Edmond

An equally important discovery and one which came as a surprise to most oil companies, was the Gutowsky well in Oklahoma County. Location of the well was contrary to the opinion of a number of geologists and when the well came in, it is said that only one company was represented at the site. This test was 1 Wagner in NW NW SW 32-14n-4w, and was drilled to the second Wilcox at 7,690 ft. Finding the Wilcox zone dry, operators plugged back and perforated the Hunton at 6,952-57 ft. Oil flowed over the top of the derrick at an estimated 50-100 bbl. an hour. On last report Magnolia's ½-mile southwest offset was in the Hunton and showed every indication of becoming an equally good producer.

Another discovery worth mentioning is the new Big Bend pool of Osage County, opened in April by A. G. Oliphant and Charles B. Peters at the 1 Osage, NE NE SW 20-25n-3e. It was drilled to 3,852 ft. and found the Mississippi lime dry. Plugged back to the Layton sand at 2,850-75 ft., casing was set and the well headed and flowed an estimated 100 bbl. of oil an hour. Location is some 6 miles southeast of Ponca City. At the end of 6 months' period, one offset had been completed for a potential of 1,168 bbl. a day.

(Continued on Page 186)

PRODUCTION—OKLAHOMA

(In thousands of barrels)

NORTHEASTERN DISTRICT

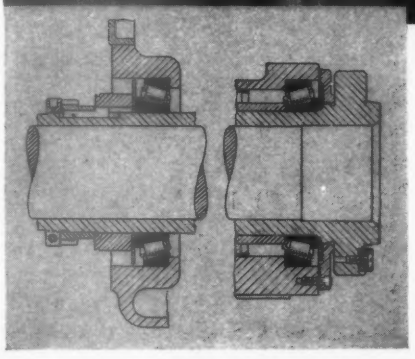
	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Washington County	529	578	4,435	4,520
Nowata County	1,525	1,861	7,190	7,328
Rogers County	380	423	3,182	3,402
Osage County:				
Burbank	1,618	1,561	1,694	1,697
South Burbank	1,307	1,296	223	223
Naval Reserve	433	474	233	233
Avant	397	380	753	919
Atlantic	147	155	88	90
Other Osage	1,632	2,154	4,979	4,862
Total Osage	5,534	6,020	7,970	8,024
Total N.E. Oklahoma	7,968	8,882	22,777	23,279

EAST CENTRAL DISTRICT

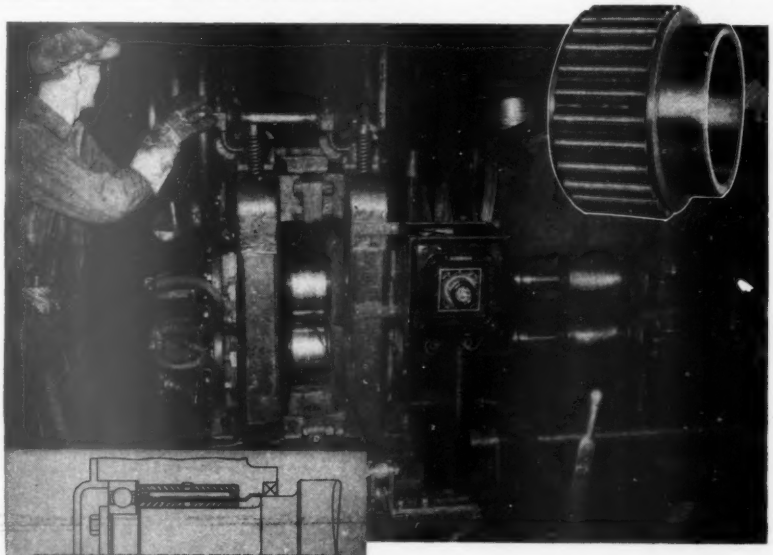
Tulsa County	377	572	2,727	3,139
Wagoner County	91	119	365	490
Okmulgee County	479	655	1,998	2,040
Muskogee and McIntosh counties	118	120	435	515
Creek County:				
Bristow-Slick	762	828	1,075	1,129
Cushing-Shamrock	1,489	1,547	1,741	1,774
Glenn-Sapulpa	876	910	1,869	1,941
Manford-Olive	191	222	423	441
East Stroud	76	106	44	45
Other Creek	494	474	578	534
Total Creek County	3,868	4,087	5,730	5,864
Total E.C. Oklahoma	4,933	5,553	11,255	12,047
Seminole County:				
Bethel and North	256	260	61	57
Bowlegs	864	969	206	209
Carr City	306	341	73	79
Cromwell district	900	1,465	310	316
Dora	133	179	104	107
Earlsboro district	1,678	1,988	384	348
Keokuk	353	570	96	97
Konawa district	272	377	161	166

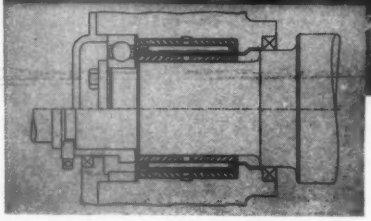
(Continued on Next Page)

IN THE NEWS
WITH TORRINGTON—BANTAM



HAIR-BREADTH PRECISION WORK at high speeds is being turned out with turret lathes such as this to help win the battle of production. Built by Gisholt Machine Company, this lathe employs Ultra-Precision Tapered Roller Bearings on the spindles (see cross-section) as an aid in maintaining extreme accuracy. The eccentricity and face run-out of these bearings is .0002 maximum—an outstanding example of the ability of Bantam Bearings Division to build precision bearings for heavy-duty applications.





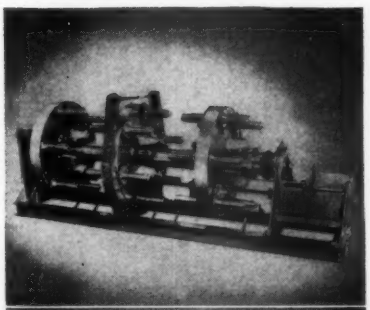
HIGH CAPACITY in a small space is provided by straight radial roller bearings in this 8-inch flattening mill built by Broden Construction Company, while ball bearings, also designed by Bantam Bearings Division, take the thrust load. The bearing arrangement, shown in cross-section, permits compact design.

NEEDLE BEARINGS— ALL TYPES—ALL SIZES

NEEDLE BEARINGS TYPE DC are complete, self-contained units consisting of a full complement of rollers and a drawn, hardened outer race. They offer the advantages of small size, low cost, high capacity—and easy installation.

NEEDLE BEARINGS TYPE NCS consist of a full complement of rollers and a relatively heavy hardened outer race. They are furnished with or without inner races. Needle Bearings Type NCS are adaptable to heavier loads than Needle Bearings Type DC.

NEEDLE ROLLERS TYPE LN are produced in a range of types and sizes for assembly into low-cost, high-capacity anti-friction bearing units. Our engineering department will make recommendations as to correct size and type selection.



ROTATING 650 POUNDS OF WIRE AT 120 R. P. M. requires spindles of exceptionally high load capacity in wire stranding units built by The Watson Machine Company. Dependability in the main sheave bearings under this severe strain is assured by the use of Ball Radial Bearings. Designed and built by Bantam Bearings Division, these bearings have withstood years of such service without a single replacement.

ARMY (E) NAVY

TORRINGTON BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

THE TORRINGTON COMPANY · BANTAM BEARINGS DIVISION

SOUTH BEND 21, INDIANA

PRODUCTION—OKLAHOMA (Continued)

GREATER SEMINOLE DISTRICT

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Little River district	985	1,225	299	313
Mission	162	191	60	62
Sasakwa	176	221	70	71
Searight district	250	257	72	87
Seminole district	1,292	1,446	416	420
Wewoka district	320	287	132	128
Grayson and North	78	108	33	33
Traugh	63	77	34	38
Allen district	680	766	480	454
Miscellaneous	215	367	87	95
Total	8,983	11,094	3,078	3,120
Pottawatomie County:				
Asher and West	59	62	37	33
Avoca	55	132	18	17
Brooksville	157	38	9	7
Gray	142	168	26	26
Hotulke, West	228	786	24	22
Maud and South	116	215	63	67
McComb and South	52	.....	5	.....
Prague	101	120	17	14
Romulus and Townsite	87	186	20	22
Shawnee district	280	210	54	52
St. Louis district	2,087	3,003	831	893
Tecumseh district	117	444	19	22
Miscellaneous	58	183	78	24
Total	3,539	5,547	1,141	1,204
Okfuskee County:				
Dill and South	174	286	83	90
Okemah district	136	142	71	73
Olympic	214	257	324	324
Rusk	304	264	9	8
Weleetka district	127	212	92	93
Miscellaneous	274	374	676	763
Total	1,229	1,535	1,275	1,351
Hughes County:				
Adams	127	121	10	10
Fish	359	515	140	142
Holdenville	85	98	107	114
Papoose	86	96	55	48
Miscellaneous	80	145	86	87
Total	737	975	398	401
Pontotoc County:				
Bebee district	551	579	237	248
Fitts, N, S and W	1,263	1,706	717	764
Jesse	302	312	30	34
Miscellaneous	64	52	57	41
Total	2,180	2,649	1,041	1,037
McClain County:				
Byars	83	88	11	8
Coal County	15	16	7	7
Total Greater Seminole	16,766	21,804	6,951	7,173

WEST CENTRAL DISTRICT

Caddo and Kiowa counties:				
Apache	1,138	654	28	22
Cement	1,236	2,105	355	327
Hobart	47	259	23	30
Total W. C. Oklahoma	2,421	3,018	406	379

SOUTH CENTRAL DISTRICT

Bryan, Marshall and Love counties:				
Cumberland	1,613	1,060	73	46
Miscellaneous	47	30	172	150
Total S. C. Oklahoma	1,660	1,090	245	196

NORTH CENTRAL DISTRICT

Garfield, Grant, Kay, Logan and Noble counties:				
Blackwell	68	95	40	44
Billings	887	1,115	80	84
Braman	152	225	72	76
Crescent	381	240	49	34
Dilworth	131	70	77	76
Garber	292	308	535	541
Guthrie	424	654	32	32
Hubbard	68	78	36	36
Langston	73	180	14	15
Liberty and East	134	.....	3	.....
Lucien	839	946	119	134
Lovell and South	84	102	15	16
Navina and West	61	26	9	3
Otoe City	54	33	9	3
Polo	90	127	27	28
Tonkawa	271	290	170	180
Vernon	73	46	21	17
Miscellaneous	189	139	162	170
Total N. C. Oklahoma	4,266	4,674	1,470	1,189

CENTRAL DISTRICT

Payne, Pawnee and Lincoln counties:				
Chandler & Hoyt	96	132	48	49
Coyle	867	606	36	34
Cleveland-Keystone	139	146	446	445
Davenport	98	125	114	125
Laffoon	89	109	13	13
Lauderdale	92	112	184	183
Ramsey	812	822	41	42
Sac & Fox	94	136	141	141
Stroud-Skellyville	89	91	37	38
Watchorn and East	589	92	35	16
Wilzetta and West	89	53	12	16
Yale district	402	387	502	501
Miscellaneous	377	351	212	193
Total	3,833	3,162	1,821	1,793
Oklahoma and Cleveland counties:				
Britton and South	51	71	24	26
Edmond and Northeast	576	545	94	89
Moore	135	147	26	32
Oklahoma City	10,699	13,985	749	818
Miscellaneous	37	90	8	12
Total	11,498	14,838	901	977
Total Central Oklahoma	15,331	18,000	2,722	2,773

SOUTHWESTERN DISTRICT

Carter, Comanche, Cotton, Garvin, Grady and Stephens counties:				
Duncan district	533	592	519	515
Graham-Fox	329	337	340	356
Healdton	1,307	1,492	1,875	1,896
Hewitt and West	1,241	1,920	908	890
Knox	249	275	177	175
Loco-Milroy	105	140	221	213
Pauls Valley	705	54	16	4
Robberson	145	153	166	176
Sholem-Alechem	400	428	306	310
Tatums-Tussy	841	833	315	322
Velma	270	195	656	652
Walters	130	136	223	239
Wildcat Jim	262	82	85	88
Doyle	123	85	.....	39
Caddo	88	.....	1	.....
Miscellaneous	211	175	400	421
Total	6,939	6,897	6,208	6,296
Jefferson, Jackson and Tillman counties:				
Altus	89	123	111	115
Tipton	70	87	57	33
Oscar	195	217	191	191
Spring	79	91	38	38
Frederick and West	191	326	32	57
Red River	48	51	79	90
Miscellaneous	9	8	40	49
Total	681	903	548	573
Total S.W. Oklahoma	7,620	7,800	6,756	6,869
Total Oklahoma	60,965	70,821	52,582	54,210

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ISO-BUTANE
PROPANE

WARREN PETROLEUM CORPORATION

Manufacturers, Exporters and Marketers of Natural Gasoline and Liquefied Petroleum Gas

Tulsa, Oklahoma

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(Continued from Page 182)

Important extensions and new pay zones were added to a number of fields. The Medrano sand was added to the southwest corner of the Cement pool at Ray Stephens 1 Pierson, SE SW SE 35-6n-10w. It flowed 588 bbl. in 8 hours in sand at 5,579-5,697 ft. Activity at the Byars pool of McClain County was revived and five wells drilled during the 6 months extended its limits 1 mile south. Three wells completed at Pauls Valley extended the field northwest, northeast and southeast and at the close of the period a good well was reported nearing completion to extend the southwest side.

The present outlook for Oklahoma is not good. Total completions dropped 14.8 per cent in 1943 and oil wells were down 18 per cent. However, 11 wells were drilled below 6,500 ft. in 1943 compared to 9 last year. Many operators are hopeful of extending the granite wash production of West and North Texas into southern Oklahoma. Gulf Oil Corp.'s Washita County wildcat, 1 Hopkins in NW SE 8-8n-20w, made a 100-bbl. well in the granite wash at 5,550-62 ft.

Anadarko Basin

In recent years future oil reserves were looked to in the Anadarko basin and possibly western Oklahoma. However there were no wells of importance drilled in either area the first 6 months of 1943. Jackson, Greer, Kiowa, Comanche and Cotton counties accounted for 13 dry wildcats.

The end of the first half of 1943 found the majority of drilling wells in Creek County. Part of this is accounted for by repressuring programs and water input wells, although a fair return is shown in these shallow areas by reason of the small amount of equipment used. Oklahoma dropped to fourth among producing states as production was down some 10 million barrels compared with the same period last year, a decrease of 14 per cent.

Operations in northeastern Oklahoma, including Craig, Nowata and Washington counties, has slackened considerably this year. The decline, however, is due to finished repressuring and water-flood programs, which were at their height last year. Although the area is not scouted at present by oil companies, drilling and cleanout operations, requiring a minimum of equipment, are still carried on.

OKLAHOMA

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Apache	1	1	179	0	0
Ardmore	2	0	0	0	2
Big Bend	1	1	1,168	0	0
Brooksville	2	1	408	0	1
Byars	6	5	905	0	1
Caddo, Deep	2	0	0	0	2
Cement	7	5	1,489	1	1
Crescent	2	2	569	0	0
Cromwell	1	1	425	0	0
Cumberland	18	17	6,136	0	1
Doyle	1	1	102	0	0
Earlsboro, N.	1	1	240	0	0
Edmond, NE	6	6	224	0	0
Garber	3	3	99	0	0
Guthrie townsite	2	1	120	0	1
Hewitt	1	1	214	0	0
Hotulke	1	1	118	0	0
Lake Shawnee	4	0	0	0	4
Liberty	3	0	0	0	3
Loco	14	12	718	0	2
McComb	4	1	375	0	3
Oklahoma City	3	3	621	0	0
Pauls Valley	3	3	752	0	0
Roper	3	3	137	0	0
Rusk	1	1	600	0	0
Seminole and W	8	6	561	1	1
Shawnee, NE	2	2	742	0	0
Sylvian	3	2	133	0	1
Velma	21	11	715	1	9
Watchorn, E	10	6	1,573	1	3
Wewoka townsite	7	6	1,181	0	1
Misc. counties:					
Creek	71	44	1,619	6	21
Le Flore	2	0	0	0	2
Okfuskee	10	4	187	3	3
Okmulgee	10	1	4	4	5
Osage	38	20	498	5	13
Pawnee	6	4	37	0	2
Seminole	11	3	151	0	8
Tulsa	7	3	49	0	4
Wildcats	163	25	4,672	10	128
Miscellaneous	74	35	1,328	13	29
Total	535	242	29,049	45	248

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	89	31	4	54	273,607
February	81	34	10	37	242,227
March	113	51	14	48	382,470
April	84	41	4	39	282,821
May	65	28	5	32	223,486
June	103	57	8	38	407,573
First half 1943	535	242	45	248	1,812,184
First half 1942	628	295	47	286	2,017,921
Difference	93	53	2	38	205,737

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Atoka	1	0	0	0	1
Beckham	3	0	0	0	3
Caddo	1	0	0	0	1
Carter	2	0	0	0	2
Cleveland	3	1	315	0	2
Coal	1	0	0	1	0
Comanche	6	0	0	1	5
Cotton	3	0	0	0	3
Creek	7	4	381	0	3
Garfield	2	0	0	0	2
Garvin	6	0	0	0	6
Greer	1	0	0	0	1
Haskell	2	0	0	0	2
Hughes	8	3	837	3	2
Jackson	1	0	0	0	1
Jefferson	4	0	0	0	4
Kay	4	0	0	0	4
Kiowa	3	0	0	0	3
Lincoln	16	1	205	0	15
Logan	2	0	0	0	2
Marshall	2	0	0	0	2
McClain	2	1	200	0	1
McIntosh	2	0	0	0	2
Muskogee	1	0	0	0	1
Noble	6	2	380	0	4
Okfuskee	7	0	0	1	6
Oklahoma	6	2	603	0	4
Okmulgee	2	0	0	0	2
Osage	7	1	309	0	6
Pawnee	8	1	2	1	6
Payne	8	3	288	2	3
Pittsburg	3	0	0	1	2
Pontotoc	3	0	0	0	3
Pottawatomie	11	3	1,573	0	8
Seminole	6	2	69	0	4
Sequoyah	1	0	0	0	1
Stephens	11	1	113	0	10
Tillman	1	0	0	0	1
Total	163	25	4,672	10	128

Much Activity Promised by Steamboat Butte and Elk Basin Discoveries

by T. R. Ingram

DRILLING operations in the Rocky Mountain area, comprising Colorado, Wyoming, Montana and northwestern New Mexico, resulted in the completion of 166 wells in the first half of 1943, compared with 149 in the same period in 1942, an increase of 17 or 10.2 per cent. Northwest New Mexico was the only district in the area showing a decrease. Of all wells completed, 108 were oil producers, an increase of 7 or 6.5 per cent; 23 were gas wells, an increase of 13 per cent; and 35 were dry and abandoned, an increase of 7 or 20 per cent. Initial production in the period was 21,008 bbl. per day, as against 17,797 bbl. last year, an increase of 3,211 bbl. or 15.3 per cent. Average initial production per well increased from 176 bbl. to 194.5 bbl., a gain of 18.5 bbl., or 9.5 per cent.

Wildcat wells usually do not get started in the area until late in the season, due to climatic conditions, and the first half of 1943 does not fully reflect the entire year's trend. In the 6 months there were 26 wildcats completed, of which 8 were oil discoveries, 3 were gas discoveries, and 15 were dry holes. The 11 discoveries were at the rate of 42 per cent of wells completed, of which 31 per cent were oil wells.

Steamboat Butte

The outstanding oil discovery of the year was on the Steamboat Butte structure, in Fremont County, Wyoming, in which the British-American Oil Producing Co. brought in its 1-E Tribal in the Sundance sand for an initial production of 623 bbl. It was the first oil discovery in the Sundance of importance made in the general area of western Wyoming and will make that horizon more attractive in the future for wildcatters. The field lies just to the north of the Pilot Butte field, a discovery in the Tensleep last year. The well was headed for that horizon, but encountered good shows in all horizons down to the Sundance and stopped in that formation when a good producer was developed.

The Elk Basin field in northern Wyoming, however, came in for the greatest attention. This is an old field in the Frontier formation, and last year the Minnelusa Oil Corp. made a discovery in a deeper horizon, producing 100 bbl. an hour from the Tensleep. In the first half of this year the Ohio Oil Co. drilled to the second bench of that horizon and found it productive. It is listed as a discovery, but the greatest importance of the development lies in the extensions drilled in the Tensleep. With outpost wells completed and being completed at the end of the 6 months' period, it looks as though the field will be a major development, the productive area being at least 4 miles long and from 1 to 2 miles wide, with the limits undefined. The area is not unitized and development on a large scale is in the offing.

To the east of Elk Basin by 12

(Continued on Page 190)

PRODUCTION—ROCKY MOUNTAIN AREA

(In thousands of barrels)

WYOMING

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Big Medicine Bow	118	126	8	10
Big Muddy	195	200	145	149
Byron	1,180	811	25	16
Cole Creek	200	178	21	14
Circle Ridge	152	.....	9	.....
Dallas Derby	69	64	41	42
Elk Basin	325	116	149	144
Frannie	619	607	26	24
Garland	198	268	19	15
Grass Creek	737	782	343	330
Hamilton Dome	243	176	34	33
Hudson	42	52	12	11
La Barge	298	571	146	122
Lance Creek	3,769	4,035	224	164
Lost Soldier	1,000	1,235	84	85
Maverick Springs	292	454	35	24
Mule Creek	52	63	44	42
Maloney	147	197	9	10
Natches	52	.....	5	.....
Oregon Basin	2,392	1,879	88	57
Osage	93	103	201	292
Pilot Butte	209	32	11	6
Quealy	85	82	20	17
Rock River	451	477	56	47
Poison Spider	41	34	14	14
Salt Creek	2,377	2,498	1,819	1,870
South Casper Creek	95	84	21	21
Steamboat Butte	41	.....	1	.....
Wertz	1,044	1,182	20	17
Miscellaneous	84	169	79	82
Total	16,628	16,475	3,709	3,657

COLORADO

Iles	229	274	25	31
Hiawatha	86	86	9	5
Moffat	60	65	10	13
Price	208	168	10	9
Rangely	141	128	20	15
Wellington	54	64	21	17
Wilson Creek	314	255	11	7
Miscellaneous	64	72	95	118
Total	1,156	1,112	201	215

MONTANA

Cat Creek	59	75	118	104
Cut Bank	2,620	2,764	703	662
Kevin-Sunburst	886	893	1,146	1,084
Pondera	97	132	152	153
Miscellaneous	82	99	31	33
Total	3,744	3,963	2,150	2,036

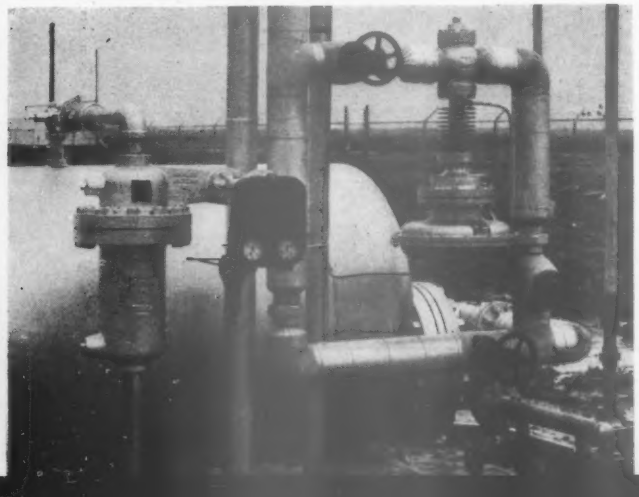
HANLON-WATERS, INC.
H-W

THE STANDARD

Automatic Control Equipment

Two forged steel bodied H-W Type 15 DRT Pilot Operated back pressure Regulators controlling 3,000 lbs., pressure on field lines to plant. Operated by H-W Type 275 Pressure Pilot Controllers.

BELOW: Stabilizer Reboiler equipped with H-W Type 850 Displacement Level Controller and H-W Type 97 F Duplex Diaphragm Steam Control Valve. The Type 97 gives exact temperature control because of construction features such as —NO Stuffing Box to cause friction; compensating action maintaining constant down-stream pressure regardless of load variations without valve positioners or reset mechanism.



FOR every control problem you can DEPEND on Hanlon-Waters Automatic Control Equipment, the STANDARD FOR PERFORMANCE. Today more than ever before, it is imperative that your plants' vital controls be HANLON-WATERS Equipped. Through many years of faithful service H-W has become the symbol of standard for high performance throughout the country's Refineries, Chemical and Natural Gasoline Plants. HANLON-WATERS engineers have pioneered many notable contributions to control equipment, outstanding being the H-W Type 850 Displacement Level Controller, introduced over four years ago and still the Leader!

NO THE LEVEL CONTROLLER WITH STUFFING BOX ..... LEAKAGE ..... FRICTION

There are HANLON-WATERS Controls to meet every requirement, either standard or special designed and for plants using highly corrosive liquids, special equipment is available. Information on all HANLON-WATERS Equipment is available from the representative nearest you.

ASK THE MEN WHO OPERATE THEM
—They Are Our Best Customers

TIME CYCLE CONTROLLERS
For Gas Lift Operation

H-W Type 980 Time Cycle Controller with Type 245 Regulator mounted on 1" S. G. Type 86 Motor Valve

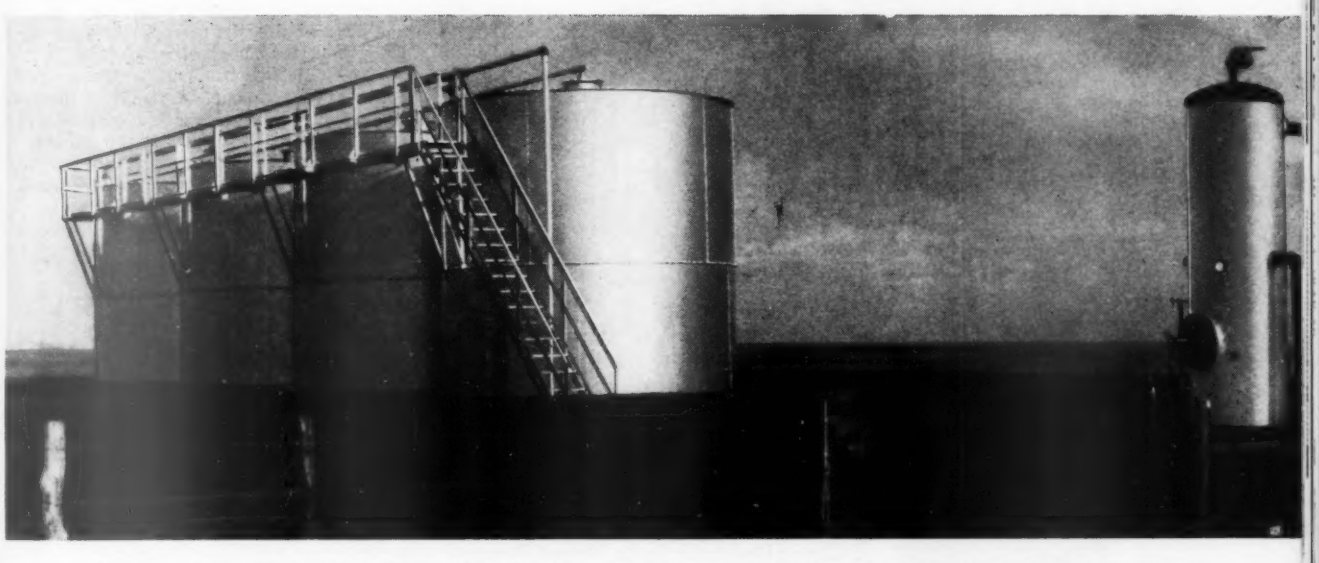
Left: *Case Closed*

Right: *Case Open*

FOR PERFORMANCE

HANLON-WATERS, INC.

OIL & GAS SEPARATORS
API BOLTED TANKS
WELDED STEEL STORAGE TANKS



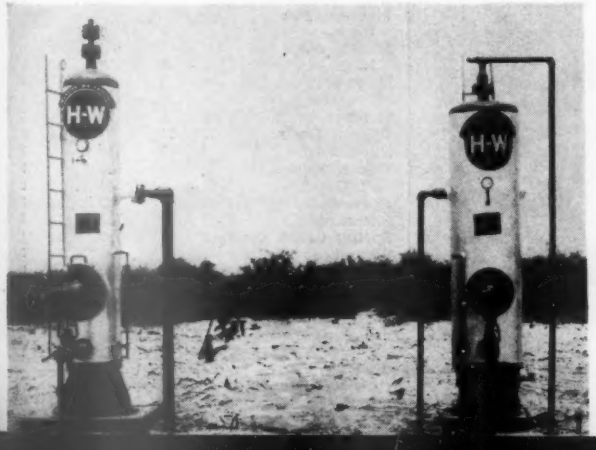
H-W 3' x 11' — 125 lbs. Type CU-1S Oil & Gas Separator and Battery of 4-High 500 bbl. Tanks installed in West Texas area.

API Bolted Steel Tanks of all standard sizes and gauges, walkway, stairway and accessory equipment. Vapor Control Valves for maintenance of gravity and volume.

Welded Steel Tanks of 100, 150, 210 and 250 bbl. sizes are expertly fabricated of new steel only; have combination Pressure-Vacuum Thief Hatches, Foundation Rings, Stairs and Walkways. Welded Steel Tanks stocked only at Wichita Falls, Texas, for Delivery at any Point.

[API Bolted Steel Tanks and Welded Steel Tanks for oil country use are stocked for immediate delivery]

H-W OIL & GAS SEPARATORS
• Highly Efficient Separation



FEATURES:

- Both Standard and API-ASME Code Construction in 125 lbs. working pressure vessels.
- API-ASME Code Construction for all vessels above 125 lbs. W.P.
- Lowest Maintenance Cost.
- Highest quality accessory valve equipment, H-W designed and manufactured.

FEATURING REMOVABLE SEAT RING ASSEMBLY IN 125 LBS. FLANGED ANGLE SERIES 800 OIL VALVES, both lever and diaphragm actuated. Valve port size in 4-in. valves can be reduced to 2-in. double or single port, if higher pressures are to be maintained on Separator and oil level assured in vessel.

All Pilot Control Accessories assembled on Type 301 Panel for 125 lbs., W.P., and Type 302 for 250 lbs., and above, where gas operated level control is utilized.

STOCKED FOR IMMEDIATE DELIVERY

Stocks at TULSA; HOUSTON, WICHITA FALLS, BRECKENRIDGE, ODESSA, CORPUS CHRISTI, Texas; SHREVEPORT, Louisiana.

HANLON-WATERS, INC.

TULSA, OKLAHOMA

NEW YORK, CHICAGO, PITTSBURGH, PHILADELPHIA, ST. LOUIS, DENVER, LOS ANGELES, SHREVEPORT, LA., FORT WORTH, HOUSTON, CORPUS CHRISTI, AND ODESSA, TEXAS

The continuous operation of the oil producing industry—wells and pipe lines—is dependent on the quality and efficiency of its equipment. Watson-Stillman Forged Steel Fittings—Elbows, Tees, Laterals, Couplings, Bushings, Caps, Plugs and Unions—are accurately formed from solid steel billets. Watson-Stillman Hydraulic Jacks, Valves, Pumps and Wire Rope Shears are indispensable accessories in keeping oil production up to its expanded schedule. The Watson-Stillman Co., Roselle, N. J.

For each of the W-S products shown here a special Booklet has been prepared. They contain detailed, practical information on the complete line. You may have copies of any or all on request.

WATSON-STILLMAN

Distributor Products Division

Engineers and manufacturers of Forged Steel Fittings, Valves, Wire Rope Shears, Pumps, Jacks and Hydraulic Equipment

For Victory ★★★ Let's all be Scrappers

4291

(Continued from Page 187)

miles a discovery in the Madison, below the Tensleep, was made in one well. It showed for 840 bbl. initial. It opens an area to the north of a major fault bisecting the field in that horizon and it is considered possible that the Madison may be continuous westward to and be productive under Elk Basin. A Madison lime discovery also was made in the Oregon Basin field, coming in for 1,440 bbl., but the horizon will be held for future needs and the well was plugged back and completed in the Embar.

Two of the gas discoveries were on the Douglas Creek structure, in western Colorado, and an extension of the Fulcher Basin gas field in northwestern New Mexico, neither of which were classed as major developments. The third, in the Tocito area, Northeast New Mexico, was turned back to the Government.

COLORADO

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Buckingham	1	0	0	0	1
Boulder	1	0	0	0	1
Rangely	4	2	75	0	2
Wilson Creek	1	1	320	0	0
Total	7	3	395	0	4

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	1	0	0	1	7,006
February	1	0	0	1	1,350
March	2	1	0	1	9,421
April	2	1	0	1	2,181
May	0	0	0	0	0
June	1	1	0	0	660
First half 1943	7	3	0	4	20,618
First half 1942	5	3	0	2	26,171
Difference	2	0	0	2	5,553

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Jackson	1	0	0	0	1
Weld	1	0	0	0	1
Total	2	0	0	0	2

WYOMING

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Badger Basin	1	0	0	0	1
Byron	3	3	762	0	0
Cole Creek	3	2	185	0	1
Dewey	1	0	0	0	1
Elk Basin	3	3	3,944	0	0
Frannie	1	1	720	0	0
Horn Valley	1	0	0	0	1
Horse Creek	1	1	40	0	0
Iron Creek	1	1	10	0	0
La Barge	2	2	126	0	0
Lance Creek	6	6	703	0	0
Lost Soldier	1	1	500	0	0
McCullough's Peak	1	0	0	0	1
Middle Allen Lake	1	0	0	0	1
Moorcroft	1	0	0	0	1
Newcastle	1	0	0	0	1
Notches	1	1	75	0	0
Oregon Basin	15	15	5,187	0	0
Pilot Butte	4	1	399	1	2
Poison Spider	1	1	60	0	0
Salt Creek	1	1	248	0	0
Shawnee	1	1	30	0	0
Sherrard	1	0	0	0	1
Spring Creek	1	0	0	0	1
Steamboat Butte	1	1	623	0	0
Wertz	1	1	73	0	0
Total	55	42	3,685	1	12

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	16	11	1	4	57,811
February	7	6	0	1	20,544
March	3	1	0	2	12,081
April	13	10	0	3	58,746
May	12	11	0	1	50,439
June	4	3	0	1	18,890
First half 1943	55	42	1	12	218,511
First half 1942	47	35	2	10	177,388
Difference	8	7	1	2	41,123

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Carbon	3	0	0	0	3
Crook	1	0	0	0	1
Fremont	2	1	623	0	1
Laramie	1	1	40	0	0
Park	6	4	3,720	0	2
Weston	2	0	0	0	2
Total	15	6	760	0	9

NORTHWEST NEW MEXICO

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Fulcher Basin	3	0	0	3	0
Hospah	2	2	108	0	0
Tocito	1	0	0	1	0
Total	6	2	108	4	0

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
March	1	0	1	0	2,136
April	2	1	1	0	3,798
May	2	1	1	0	7,905
June	1	0	1	0	1,890
First half 1943	6	2	4	0	15,729
First half 1942	13	9	2	2	32,760
Difference	7	7	2	2	17,031

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
San Juan	2	0	0	2	0

MONTANA

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Aloe	1	0	0	0	1
Bowdoin	9	0	0	8	1
Cedar Creek	8	0	0	8	0
Clark's Fork	1	0	0	0	1
Cut Bank	39	35	5,116	1	3
Dunkirk	1	0	0	0	1
Kevin-Sunburst	37	26	1,704	1	10
Midway	1	0	0	0	1
Red Creek	1	0	0	0	1
Total	98	61	6,820	18	19

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	18	10	6	2	34,405
February	8	5	1	2	18,369
March	14	9	3	2	30,953
April	15	11	2	2	34,222
May	23	14	3	6	47,648
June	20	12	3	5	43,380
First half 1943	98	61	18	19	208,980
First half 1942	84	54	16	14	199,439
Difference	14	7	2	5	9,541

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Carbon	1	0	0	0	1
Pondera	1	0	0	0	1
Toole	5	2	290	0	3
Total	7	2	290	0	5

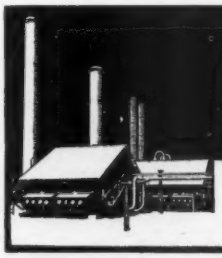
"The life and soul of science is its practical application."
— Lord Kelvin

1743-1794

Antoine Laurent Lavoisier, while a notable chemist, devoted considerable attention to physical problems of heat. Some of the earliest thermochemical research was credited to Lavoisier.

Lavoisier's well-known experiments with combustion have been important contributions to heat applications. He made notable experiments with oxygen, to which he gave that name.

Pioneering physicists made scientific discoveries. Research and constructive engineering applied these discoveries to industrial usefulness. Alcorn, pioneer in heating for petroleum processing, places at your disposal 19 years' continuous engineering research and successful experience in providing efficient, economical heaters for the diverse, ever-changing demands of oil refining.



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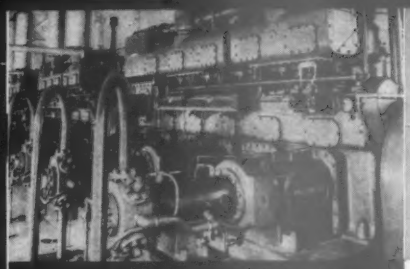
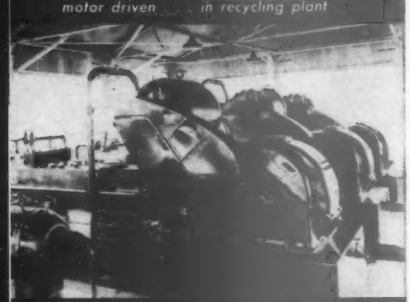
EQUIPMENT FOR REFINERIES



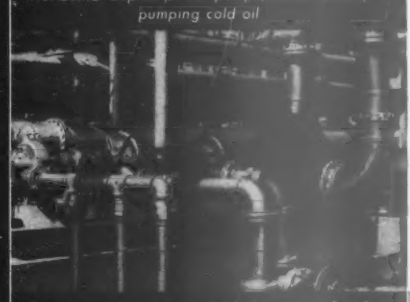
Angle gas engine-compressor in sizes from 150 to 1000 brake horsepower

High-pressure oil pipe line pump, diesel engine driven

Centrifugal and reciprocating pumps, motor driven . . . in recycling plant



Horizontal duplex power pumps, motor driven, pumping cold oil



Pumping units comprised of three centrifugal pumps in line . . . turbine driven

A group of HiVol steam pumps handling highly volatile liquids

★

STEAM TURBINES
All types 25 hp. to 10,000 hp.

COMBINED STEAM TURBINE AND REDUCING GEAR UNITS
5 hp. to 200 hp.

REDUCING AND INCREASING GEARS

DIESEL ENGINES
150 hp. to 1500 hp.

GAS ENGINES
175 hp. to 2880 hp.

CONVERTIBLE GAS-DIESEL ENGINES
150 hp. to 1500 hp.

STEAM CONDENSERS
Of all capacities, with all auxiliaries.

VACUUM PUMPS

STEAM-JET EJECTORS
For moderate to high vacuum service.

CENTRIFUGAL PUMPS
For every required application.

AIR AND GAS COMPRESSORS
For small, medium and large air supply. Steam, motor or engine driven.

FEEDWATER HEATERS AND DE-AERATORS
Open type, for individual requirements.

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TURBINE WELL PUMPS
For general, sump and other services.

STEAM, POWER AND ROTARY PUMPS
For boiler feed and varied services.

LIQUID METERS
All types; hot or cold water, oil, etc.

V-BELT DRIVES
Complete drives, sheaves or belts only.

PORTABLE COMPRESSORS AND AIR TOOLS
For construction and maintenance service.

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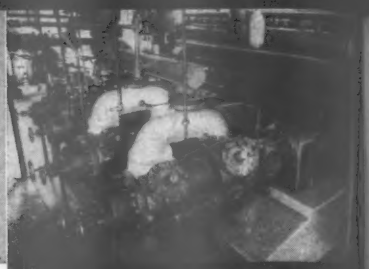
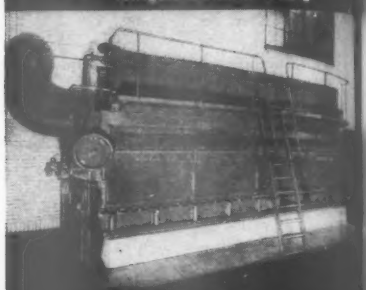
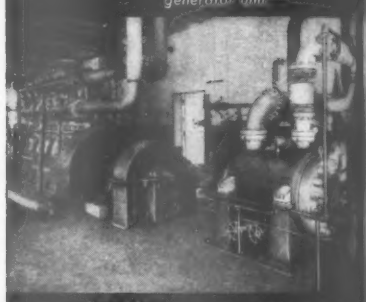
ICS-11



Angle gas engine-compressors supplying refrigeration for dewaxing



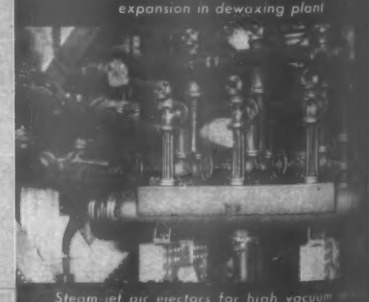
An 800-horsepower gas engine generator unit



Forged steel barrel centrifugal hot-charge . . . gas engine driven

A battery of four Type H centrifugal refinery pumps

Chilling machines for ammonia direct expansion in dewaxing plant



Steam-jet air ejectors for high vacuum . . . in power and process plants

A complete coverage for every important refinery function

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Toronto, Ontario

Haynesville Development Continues Most Important in Sabine Area

DRILLING in North Louisiana and Arkansas continued in the Pettit and Smackover limes. What was probably the most important development this first 6 months was the expansion of the Haynesville pool in Columbia County, southern Arkansas. At the end of June there were four oil wells on the Arkansas side. The same pool in Louisiana had 12 oil wells completed the first half of 1943, extending the field to the east and filling undrilled locations near the state line. Possible extent of the field is undetermined, there being no dry holes in 1943 on either side of the line and only one failure for the entire year 1942. Production is in the Pettit lime at an average depth of 5,450-75 ft.

There were three successful wildcats in North Louisiana in 1943, only one of which was a good well. This was Carter Oil Co. 2 Rhodes, 28-9n-10e, which flowed 187 bbl. of oil through choke after perforating at 4,435-42 ft. Total depth was 6,017 ft. Location of the well is in northern Concordia Parish between the Clayton gas field and the Lake St. John pool of Tensas Parish.

Another year-end discovery in 1942 that looked like a promising field the first 3 months of 1943 was the Carterville pool in northern Bossier Parish. Three oil wells were drilled there this year but since April there has been no reported activity.

Extensions and New Pays

Other Arkansas fields having major extensions or new pays were the New London and Nick Springs in Union County, Midway of LaFayette County and the Stephens pool in Ouachita County. The latter pool, producing from the Tokio and Smart sands, was the most active spot in the state, completing 19 oil wells out of 25 drilled to the lower pay. The Midway field slowed down in 1943 but added some 200 proven acres. At Nick Springs, Fohs Oil Co. 1 Grace was a deep test in 31-17s-14w, attempting to find production in Smackover lime but at 6,200 ft. plugged back to around 5,600 ft. and made a small well in the Cotton Valley. Previous production in the field was at the 3,700-ft. level in the Travis Peak zone. The well flowed 50 bbl. of oil and 50 bbl. of water a day.

In view of considerable geophysical prospecting reported in Arkansas, which is believed to have uncovered a few areas of merit, the outlook over the balance of the year should continue along the same favorable trend as during the first 6 months. While wildcat wells made a poor showing,

PRODUCTION

(In thousands of barrels)

ARKANSAS

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Atlanta	452	511	23	21
Buckner	327	410	28	28
Champagnolle	123	138	72	31
Dorcheat-Macedonia	558	559	58	36
El Dorado and East	244	242	240	262
Fouke	214	130	10	7
Garland City	43	42	9	15
Haynesville	68	.....	4	.....
Irma-Troy	267	298	112	118
Magnolia	3,181	3,263	115	115
McKamie	82	483	18	16
Midway	1,026	307	37	17
Mount Holly	77	72	11	5
New London	124	10	18	2
Nick Springs	37	77	14	14
Rodessa	112	198	60	65
Shuler	2,686	2,987	174	178
Smackover	2,263	2,462	1,600	1,582
Stephens	621	236	239	200
Urbana	380	482	52	68
Village	218	149	13	11
Miscellaneous	110	89	168	149
Total	13,213	13,190	3,080	2,981

MISSISSIPPI

Pickens-Sharpsburg	445	167	14	10
Tinsley	9,651	15,198	349	345
Miscellaneous	9	3	0	0
Total	10,105	15,368	363	355

SHREVEPORT DISTRICT

	Prod. first 6 months 1943			No. wells July 1, 1943
	Crude	Condensate	Total	
Bellevue	93	.....	93	128
Caddo	1,210	.....	1,210	1,326
Carterville district	68	.....	68	21
Converse	50	.....	50	57
Cotton Valley	390	2,098	5,488	194
Elm Grove	51	.....	51	39
Haynesville	2,915	.....	2,915	390
Homer	528	.....	528	318
Lisbon	218	88	306	130
Red River	138	.....	138	132
Rodessa	1,747	92	1,839	365
Shreveport	415	.....	415	47
Sligo	326	16	342	82
Sugar Creek	182	56	238	33
Zwolle	94	.....	94	36
Miscellaneous	34	60	94	77
Total	8,459	2,410	10,869	3,323

MONROE DISTRICT

Catahoula Lake	48	.....	48	2
Lake St. John	135	.....	135	13
Little Creek	500	.....	500	58
Nebo-Hemphill	1,792	.....	1,792	140
Olla	1,961	.....	1,961	177
South Jena	37	.....	37	4
Summerville	61	.....	61	10
Tullos-Urania	350	.....	350	190
Willow Lake	49	.....	49	2
Miscellaneous	89	.....	89	11
Total	5,022	.....	5,022	607
Total North Louisiana	13,481	2,410	15,891	3,930

the total completions increased 41 this year, or 53 per cent. Oil wells picked up from 46 in 1942 to 70 this year, a 52 per cent increase.

The future trend in drilling in North Louisiana is questionable. There was a spurt of activity last year, due to new Pettit and Smackover lime discoveries and extensions but in the first 6 months of 1943 total completions were 151, compared to 239 last year, a drop of 37 per cent.

NORTH LOUISIANA

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Caddo	12	9	282	0	3
Calvin	3	0	0	0	3
Carterville, N	3	3	542	0	0
Catahoula Lake	3	2	302	0	1
Cross Lake	2	1	48	1	0
Haynesville	12	12	2,758	0	0
Hosston	6	3	65	1	2
Lake St. John	3	2	289	0	1
Lisbon	1	0	0	0	1
Logansport	1	0	0	1	0
Manifest	2	0	0	0	2
Monroe	5	0	0	5	0
Nebo	7	6	916	0	1
Pine Island	8	7	471	0	1
Simsboro	2	1	50	1	0
Sligo	2	2	70	0	0
Sugar Creek	7	3	1,261	0	4
Urania	1	1	110	0	0
Vivian	2	0	0	0	2
Wildcats	44	3	212	2	39
Miscellaneous	25	5	110	7	13
Total	151	60	7,486	18	73

Summary of Wildcats Completed First Half of 1943

Parish—	Comp.	Oil	Prod.	Gas	Dry
Bienville	1	0	0	1	0
Bossier	5	1	10	0	4
Caddo	2	1	15	0	1
Caldwell	3	0	0	0	3
Carroll	1	0	0	0	1
Catahoula	1	0	0	0	1
Claiborne	3	0	0	0	3
Concordia	2	1	187	0	1
De Soto	3	0	0	0	3
Franklin	1	0	0	0	1
Grant	1	0	0	0	1
La Salle	1	0	0	0	1
Morehouse	2	0	0	0	2
Natchitoches	5	0	0	0	5
Red River	6	0	0	1	5
Richland	1	0	0	0	1
Sabine	2	0	0	0	2
Tensas	1	0	0	0	1
Union	1	0	0	0	1
West Carroll	1	0	0	0	1
Winn	1	0	0	0	1
Total	44	3	212	2	39

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	23	12	2	9	109,926
February	24	11	1	12	99,096
March	22	10	1	11	90,551
April	24	9	4	11	120,144
May	28	7	6	15	111,577
June	30	11	4	15	108,027
First half 1943	151	60	18	73	639,321
First half 1942	239	148	0	91	973,657
Difference	88	88	18	18	334,336

ARKANSAS

Summary of Wells Completed First Half of 1943

Field—	Comp.	Oil	Prod.	Gas	Dry
Atlanta	1	1	160	0	0
Dorcheat	4	4	408	0	0
Fouke	5	4	663	0	1
Haynesville	4	4	809	0	0
Hillsboro	3	3	73	0	0
Macedonia	9	9	1,138	0	0
Midway	6	5	590	0	1
Mount Holly	2	2	241	0	0
New London	8	6	702	0	2
Nick Springs	1	1	35	0	0
Rainbow City	1	1	20	0	0
Stephens	25	19	2,403	0	6
Wildcats	32	1	65	0	31
Miscellaneous	18	10	210	2	6
Total	119	70	7,516	2	47

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Bradley	2	0	0	0	2
Calhoun	8	0	0	0	8
Clark	1	0	0	0	1
Cleveland	1	0	0	0	1
Columbia	4	1	65	0	3
Lafayette	1	0	0	0	1
Little River	1	0	0	0	1
Miller	2	0	0	0	2
Nevada	4	0	0	0	4
Ouachita	4	0	0	0	4
Scott	1	0	0	0	1
Union	3	0	0	0	3
Total	32	1	65	0	31

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	14	10	0	4	90,752
February	19	11	0	8	94,479
March	22	10	0	12	115,971
April	15	9	0	6	67,009
May	24	16	1	7	103,775
June	25	14	1	10	118,509
First half 1943	119	70	2	47	590,495
First half 1942	78	46	6	26	448,640
Difference	41	24	4	21	141,855

MISSISSIPPI

At the close of the first 6 months, indications were that Mississippi

(Continued on Page 207)

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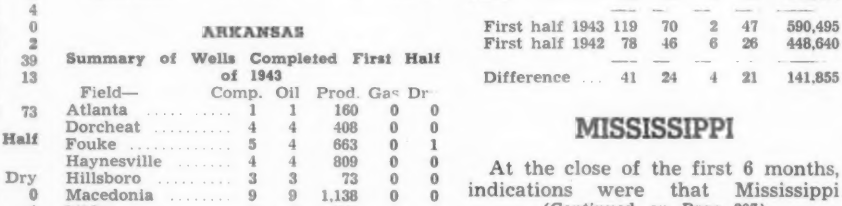

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MICHIGAN

New Fields in Northern Area Hold Production Up

MICHIGAN with 246 completed wells as its crop in the first half of 1943 compared unfavorably with its record in the first half of 1942 when 333 wells were finished. Ninety-six oil wells, 13 gas wells and 137 dry holes this year looked even worse compared with 170 oil wells, 28 gas wells and 135 dry holes in the same period last year.

Four pools that had no existence in the first half of 1942 were on the list of producers this year, but all of them were opened in the last half of last year. They are Evart pool in Osceola County; Fork in Mecosta County; Richifeld in Roscommon County, and Prosper in Missaukee County. The Evart pool produced 497,000 bbl. in the first 6 months of this year from 23 wells; Fork 213,000 bbl. from 12 wells; Richfield, 44,000 bbl. from 11 wells and Prosper 122,000 bbl. from 9 wells. All are in the northern district. These new pools did much to increase the northern crude output from 7,342,000 bbl. in the first half of last year to 8,311,000 bbl. in the same period this year. The southern district fell off from 2,933,000 bbl. to 2,215,000 bbl. The net increase in total production in the 1943 6-month period was only 251,000 bbl.

The year started off encouragingly when Gordon and Rowmor 1 Reams, in 26-22n-6w, Missaukee County, an outpost produced 67 bbl. the first hour from Dundee pay topped at 3,816 ft., total depth 3,821½ ft. About the same time in January, Sun Oil Co. A-1, S½ SW NW 11-23n-5w, Missaukee County, sought to develop production in the Enterprise structure. This test had been drilled to 4,596 ft., but was plugged back to 3,443 ft. to test the Dundee formation. After it was acidized it filled a 500-bbl. tank with fluid in a little over 1 day. The Dundee was topped at 3,184 ft. The following week saw production down to various daily figures ranging from 50 to 150 bbl. of fluid. During the remainder of the half year the crew was busy trying to make a well out of this test and was still testing in the middle of July.

Winterfield

Taggart Brothers Co., the largest gas development company in Michigan opened a gas field 4 miles northeast of the Winterfield shallow gas area in Clare County in January. The company's 1 Mills-Keen-Miltner, C NE 2-20n-6w, produced 3,650,000 cu. ft. of gas per day from the Michigan stray gas sand at 1,285-88 ft., total depth.

In February Ohio Oil Co. 1 Zimmerman, S½ NE SE 28-18n-9w, Osceola County wildcat, flowed 30 bbl. per hour initially from Dundee pay topped at 3,829-34 ft., total depth, and 2 weeks later was still flowing between 260 and 325 bbl. per day, according to the size of the choke. Meanwhile nine locations had been staked around the pool opener. It was rated as a potential 650-bbl. well.

Gordon Oil Co. et al completed a 624-bbl. well in 1 Kornoely, S½ NE SW 26-22n-6w, in Missaukee County, in March. The well was the largest initial producer in the history of the county, flowing 140 bbl. the first hour and later flowing through choke at the rate of nearly 1,250 bbl. per day from Dundee at 3,835-37 ft. It is in the Aetna-Prosper field. Late in April Smith Petroleum Co. completed a dry hole in 1 Herweyer, S½ NW SW Section 26, offsetting to the west the big well on the Kornoely farm. It developed only black water in the Dundee and was junked.

Late in the half year Pure Oil Co. opened a pool in Goodwell Township, Newaygo County, with 1 Harris, E½ NE SE 8-14n-11w, the well flowing 419 bbl. the first 15½ hours from Traverse lime at 2,722-32 ft., total depth 2,742 ft. The discovery is south of the Woodville pool but was generally considered a new pool rather than an extension to Woodville.

Fork

The Fork field in Mecosta County was extended a quarter mile south late in June by Smith Petroleum Co. 1 H. Plummer, S½ NW SW 8-16n-7w. It flowed 118 bbl. the first 15 hours and 148 bbl. the next 24 hours, then declining to 121 bbl. when produced through tubing.

The North Winterfield gas field in Clare County was extended a mile southeast by the Taggart Brothers Co. with its No. S-6, C SW 8-20n-5w, a 4,000,000-cu. ft. producer, total depth 1,270 ft. The same company in May completed a 10,000,000-cu. ft. gasser, G-1 Goodrich, SE SE SW 5-14n-11w, Newaygo County.

In the Kawkawlin pool in Bay County, Gulf Refining Co. completed its 1 Collins, N½ NW SW 1-14n-4e, in Dundee sand topped at 2,800 ft., total depth 2,935 ft. The well was acidized and responded with an ini-

(Continued on Page 207)

PRODUCTION—MICHIGAN

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Central and southern districts:				
Greendale	162	191	174	176
Porter-Yost	521	664	326	336
Sherman	61	93	58	64
Vernon-Leaton	83	120	74	76
Wise	90	122	60	60
Allegan County	310	591	461	488
Van Buren County	288	387	236	242
Walker	269	435	506	531
Kawkawlin	317	206	88	39
Miscellaneous	114	124	160	181
Total	2,215	2,933	2,144	2,193
Northern district:				
Adams	481	517	58	49
Beaverton	72	63	41	31
Bentley	41	45	39	36
Buckeye	220	255	256	275
Clayton	96	98	43	45
Evart	497	.....	23	.....
Fork	213	.....	12	.....
Freeman-Redding	266	502	112	130
Headquarters	1,211	975	42	34
Reed City	4,452	4,069	183	166
Richfield	44	.....	11	.....
Winterfield	388	634	40	29
Prosper	122	.....	9	.....
West Branch	152	177	224	222
Miscellaneous	56	7	60	2
Total	8,311	7,342	1,153	1,019
Total Michigan	10,526	10,275	3,297	3,212

CANADA

Rapid Extension of Fort Norman Gives Canada Second Large Field

by Victor Lauriston

THE outstanding feature in connection with Canadian oil operations in the first half of 1943 has been the partial disclosure of the results of the intensive drilling campaign launched about a year ago in the Fort Norman field of the far north. Till quite recently, operations were conducted under strict censorship; and even now details as to the number of wells drilled and the potential production secured are being withheld. But the official statements indicate that Fort Norman has been stepped up from two wells with a potential production of perhaps 140 bbl. a day to what is now the second largest field in Canada, with a production exceeded only by that of Turner Valley.

Drilling operations were undertaken by arrangement between the Canadian and United States governments, as a military measure, with the actual drilling largerly handled by Imperial Oil. Coincidently with the drilling campaign, surveys were made for a pipe line to deliver the oil to White Horse in the Yukon Territory. Refinery facilities, including some expansion of the existing facilities in the Fort Norman area, are also being provided. The pipe line is being temporarily financed by the U. S. Government as a military measure, Canada providing the right-of-way and security sites, facilitating the entry into the dominion of the necessary labor and equipment, and waiving royalties on the oil produced for the duration of the war. The United States will retain ownership of the pipe line till the end of the war, when it will be offered for sale, with the Canadian Government having the first right to purchase, on terms to be adjudicated if necessary by the Joint Defense Board. Construction of the main line, approximately 400 miles, was commenced from both ends, and it is expected to be in operation this year.

While details as to the results secured by the drilling campaign have not been disclosed, official production figures show that the output of the field for the 4 months January-April inclusive increased from 131 bbl. in 1942 to 57,729 bbl. in 1943, with April showing a high, up to that time, of 19,692 bbl. Unofficial estimates anticipate a production in excess of 100,000 bbl. for the January-June period of 1943. These figures represent merely the output for which transportation, storage and marketing facilities are available. It is understood that a number of potential producers are closed in, pending completion of the pipe line.

Norman Wells

The original development started with the known production at Norman Wells, about 50 miles above Fort Norman, and the drilling was gradually extended, outlying areas which showed promise of oil being systematically tested with a view to delimiting the field. So far, the limits of the producing area have not been fixed, and it is stated that every well drilled has been a producer. Drilling will be continued systematically; and preliminary survey work is being extended to areas closer to the Alaska Military Highway, where drilling for water by United States engineers has already resulted in a considerable discovery of dry gas. Hon. C. D. Howe, minister of munitions and supply, has described the Fort Norman field, so far developed, as not by any means as large as Turner Valley, but beyond this statement, and the official production figures, no information as to the potential value of the field has been given out.

The Fort Norman development was one of the three oil-seeking projects suggested for federal government sponsorship a year ago. In the Peace River block of northern British Columbia no development has yet taken place, though regulations governing prospective development have been drafted.

Tar Sands

The third government-sponsored investigation started in 1942 had to do with the utilization of the McMurray tar sands, in northern Alberta. At that time a special committee was conducting preliminary investigations into the feasibility of extracting oil from the bituminous sands. On the basis of these investigations, the federal government has taken over the small experimental plant of Abasand Oils, and has set aside funds for expanding the plant and continuing experimental work. E. A. Smith, former superintendent of the Canadian Oil Companies, Ltd., refinery at Petrolia, Ontario, has been placed in charge of operations, which will require possibly a year but which are expected to settle the question whether oil can be extracted from the tar sands on a commercial basis.

The federal government this year is expanding its survey work in connection with the search for new oil fields. All the Canadian provinces will receive attention; but the greatest activity will be in the northern

PRODUCTION—CANADA

(In thousands of barrels)

	Prod.—First 6 mos.		No. wells—July 1	
	1943	1942	1943	1942
Turner Valley:				
Limestone crude	4,556	4,907	204	189
Gas wells	28	16	35	40
Shallow crude	2	3	3	3
Natural gasoline	225	161	0	0
Red Coulee	4	5	7	7
Wainwright	8	7	6	7
Vermilion	12	26	14	12
Taber	4	5	2	1
Other Alberta fields	1	11	3	7
Total Alberta	4,870	5,143	274	266
New Brunswick	13	9	Not available	
Ontario	54	73	Not available	
Northwest Territories	102	0	Not available	
Total Canada	5,049	5,225		

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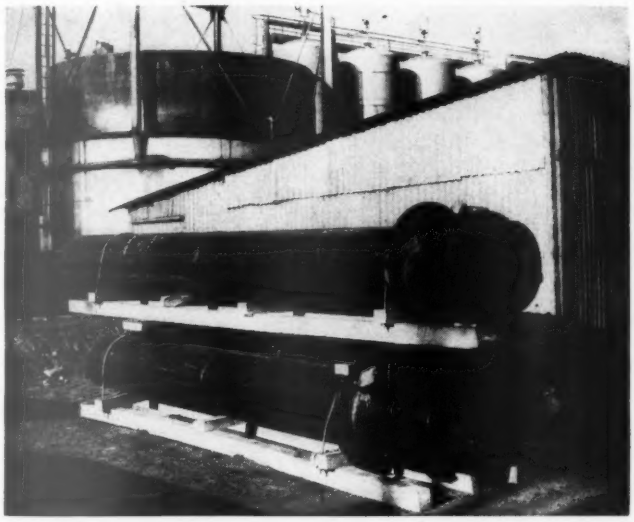

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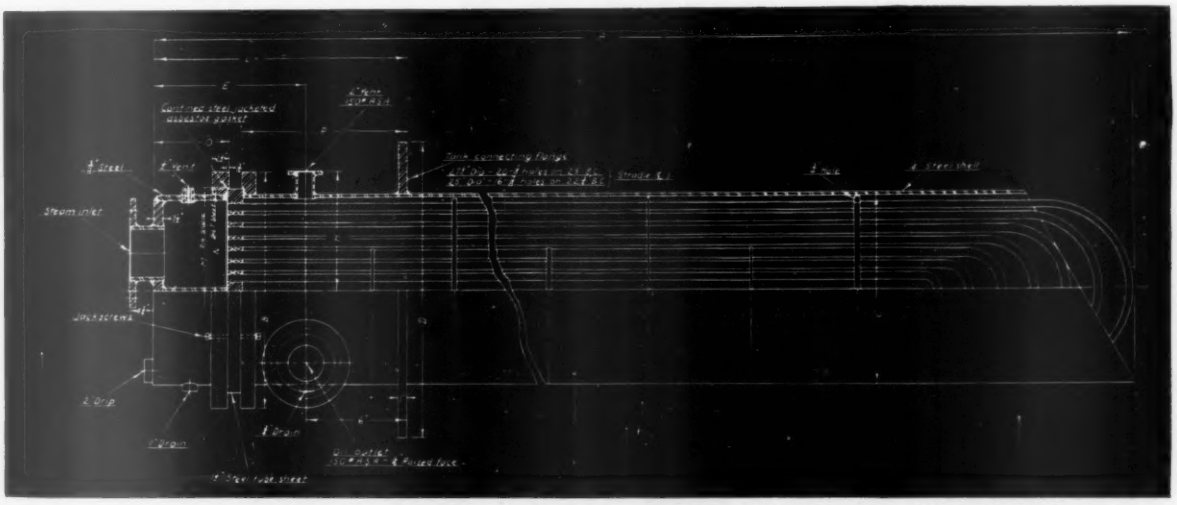

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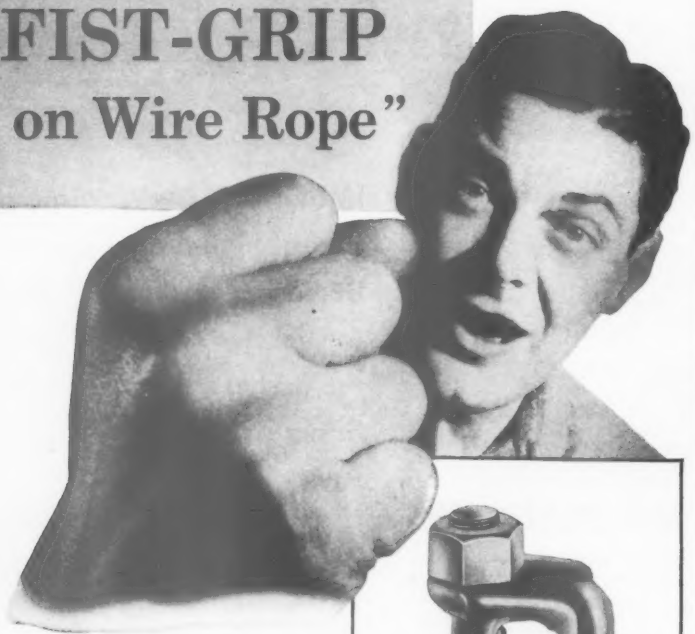

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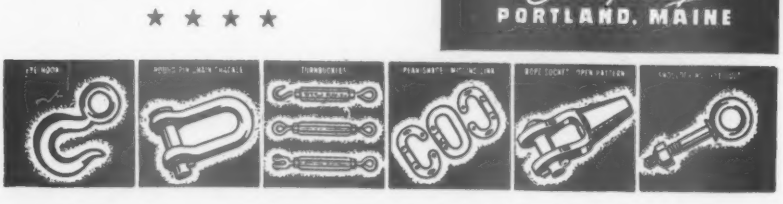

areas of western Canada brought within reach of development by the completion of the Alaska Highway.

Alberta Operations

The Turner Valley field in southern Alberta continues the dominant factor in Canadian oil production. The lack, however, of new completions sufficient to offset the gradual decline in the older wells is reflected in a decline in production, the output of Turner Valley limestone crude falling off from 4,907,442 bbl. in the first half of 1942 to an estimated 4,555,545 bbl. in the same period of 1943. There were 13 new completions in the 1943 period as against 12 in the 1942 period; but some of these were comparatively small wells. In the past 6 months there have been no marked new extensions of the proven field; the latest completions have carried the North Extension area approximately ¼ mile north of last year's limits, while a corresponding advance has been made in the extreme south. Where, last year, the early spectacular results in the North Extension (Township 21) encouraged new ventures many miles farther to the north and west—ventures now listed as temporarily shut down—the present policy is to advance more cautiously along the fringes of the known producing area. The most encouraging feature is that the latest completion in the north (British Dominion 5, LSD 5, 17-12-3w5) which started testing late in June is not merely the most northerly producer, but appears likely to be one of the largest wells in the field, indicating a strong likelihood of still farther extension. In the southwest, Brown Oil Corp. 6, LSD 15, 5-18-2w5, has proven the lime ¼ mile southeast of the nearest Northwest-Hudson's Bay producer.

The most satisfactory results in the 6 months were obtained in the original North Turner Valley area (Township 20) where, in particular, Home Oil 14, LSD 16, 33-20-3w5, secured an initial production of 1,948 bbl. daily.

There has been, however, a marked decline in Turner Valley drilling, the field starting January with 20 active tests and finishing June with 10. The federal government has now undertaken to assist in the drilling out of marginal locations, and to this end, a government-sponsored company, Wartime Oils, with a fund of $3,000,000 at its disposal, has been authorized to advance funds to assist companies and groups in Turner Valley drilling. At the end of June arrangements had already been made for at least six such tests in the west central section (Township 19) and this development is expected to continue.

Other Alberta Prospects

In contrast with the slackening of drilling in Turner Valley is the de-

creased activity in the search for new production in other parts of Alberta. The number of outside tests drilling increased from 7 at the beginning of January to 17 at the end of June.

The largest production outside Turner Valley was in the Taber field in southern Alberta, and was due largely to a single well, Dominion (formerly Standard of B. C.) Province 1, finished in 1942. A second Dominion test finished dry, but at the end of June a third well looked like a good producer. Extensive leasing by various companies in the plains area of southern Alberta foreshadows active development, though results in two tests—Dominion 1, in the Ross Lake area, and Imperial 1 on the Blood Indian Reserve—proved negative. In testing outlying areas of the Tilley field, Imperial Oil finished one dry hole near Grantham while Imperial-Armelgra 1, LSD 16, 19-13-13w4, got a small production, around 20 bbl., in the Ellis sand at 3,100-24 ft. with water in the underlying lime.

In East Central Alberta, an extensive program, launched by General Petroleums in association with the Phillips interests, is testing outlying sections of the important Kinsella gas field for oil. The first test finished a gasser around 1,975 ft.

Vermilion

The Vermilion field was handicapped by the shutting down, last November, of the processing plant at Borrodaile. Some 14 producers or potential producers had been completed, the heavy crude being processed for fuel oil for the Canadian National Railways. Some of the wells were closed in, and others ran their production into pits, for lack of processing facilities. The plant was remodeled and new equipment installed, and precessing operations were resumed in May, but at the end of June the field was not yet back in full production. In the meantime, Canadian National Railways, through a subsidiary company, Cannar Oils, secured acreage and undertook an initial 50-well drilling program, while with the resumption of processing operations assured, other interests undertook new drilling. Several wells have been carried to the sand, but definite figures on the added potential production have not been made public.

In the Athabaska district of northern Alberta, Deca 2, LSD 3, 16-66-23w4, sponsored jointly by East Crest Oil Co. and Davies Petroleum, is nearing completion on a test of a promising oil sand at 1,651 ft.

Several promising areas in the Alberta foothills are being tested. The most encouraging results are in Ram River Oils 2, LSD 8, 1-37-11w5, on the Ram River-Clearwater structure, where production test of oil shows in the Devonian limestone at 4,250 ft., is being made, after delays due to

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difficulty in securing material. Another noteworthy foothills test is on the Jumping Pound structure west of Calgary where Shell Exploration-Norman 1, LSD 5, 22-24-5w5, has established a new Canadian deep-drilling record of more than 10,332 ft.

Saskatchewan

The search for important oil fields in Saskatchwan is being pushed this year by several strong companies. Most noteworthy are the deep drilling operations south of Regina. Early in the year, Northwest-Radville, LSD 16, 36-5-19w2, was abandoned owing to drilling difficulties after attaining a depth of 7,958 ft. which carried it through the Madison and Devonian limestones. Information secured in drilling led to the location of Norcanols-Ogema 1, LSD 4, 24-7-23w2, 12 miles north and 25 miles west. The Ogema well at last reports was below 7,688 ft. and is planned to test the Madison, Devonian and Ordovician horizons. Another deep test, Imperial-Dahinda 1, LSD 10, 28-10-23w2, is below 5,092 ft. and additional drilling will be undertaken by the Norcanols-Imperial group. Several other Saskatchewan areas are being tested, with results so far inconclusive. In the Kamsack district, near the Manitoba boundary, Oil Ventures is well advanced on a program of 30 wells, to secure production from a shallow gas sand between 187 and 210 ft. Practically all the 11 wells so far completed in this area are producers.

Ontario

In the Ontario fields, the only oil operations reported are in Dunwich Township, Elgin County, where Empire Royalties of Toronto is endeavoring to revive the abandoned Dutton field. Upwards of 14 wells have been cleaned out, reconditioned and brought into production. The wells are small pumpers, between 400 and 500 ft., operated by a central pumping plant.

Drilling for gas has been active. Most of the drilling, and most of the completed gassers, are in the eastern or Haldimand-Norfolk area; but the best producers have been in the Dawn field, Lambton County, and in Zone Township, Kent County. In the latter area, southeast of the Dawn field, Union 1 Zone discovery well showed a production of 974,500 cu. ft. and may mark the opening of a new field. Subsequent drilling resulted in one dry hole and one smaller producer. A deep test of the Trenton limestone by Erie Petroleum Corp. is being drilled in Romney Township, Kent County.

ALBERTA

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	5	2	1	2	20,211
February	2	2	0	0	15,386
March	4	4	0	0	33,051
April	3	2	0	1	22,760
May	7	5	1	1	30,473
June	2	2	0	0	15,792
Total	23	17	2	4	137,673

Footage represents total of wells completed in month. Lists do not include wells which have finished drilling but have not completed testing.

Summary of Wells Completed First Half of 1943

Fields—	Comp.	Oil	Flush Gas	Gas	Dry
Turner Valley:					
Southwest	1	1	773	0	0
West Central	1	1	597	0	0
North	6	6	4,716	0	0
North Extension	5	5	3,396	0	0
Tilley	1	0	0	0	1
Armelgra	1	1	20	0	0
Blood Reserve	1	0	0	0	1
Ross Lake	1	0	0	0	1
Taber	1	0	0	0	1
Vermilion	3	3	90	0	0
Kinsella	2	0	0	2	0
Total	23	17	9,592	2	4

Completions in Ontario First Half of 1943

Township—	Wells	Gas	M.c.f.	Dry
Caistor	4	3	77	1
Camden	2	1	175	1
Canboro	1	0	0	1
Charlotteville	2	1	20	1
Dawn	4	5	1,400	1
Harwich	1	0	0	1
Malahide	1	0	0	1
Moulton	2	2	60	0
North Cayuga	2	2	87	0
Oneida	22	16	863	6
Rainham	1	0	0	1
Raleigh	1	0	0	1
Sherbrooke	1	0	0	1
South Cayuga	4	4	191	0
South Norwich	1	0	0	1
Townsend	10	5	245	5
Wainfleet	2	2	24	0
Walpole	12	10	381	2
Westminster	1	0	0	1
Windham	1	0	0	1
Woodhouse	7	3	61	4
Zone	3	2	1,224.5	1
Total	85	54	4,808.5	31

EASTERN FIELDS

Discoveries Limited to Small Oil and Shallow Gas Pools

STIMULATING new discoveries were woefully lacking in Southwest Pennsylvania during the first half of 1943. Deep Lower Devonian tests were all disappointing. In various counties of the area, local lenses added some fair shallow gas and in one case oil. New developments in new oil were nil and due to the lack of reconditioning operations production has again declined.

Beaver County.—After a considerable lull, one deep test is being drilled to the Oriskany southwest of the pool now exhausted in South Beaver Township. The present test just reached the top of the Onondaga and is running low.

Clarion County.—In Monroe Township, and about 4 miles from the nearest oil pool, one test was rated about 25 bbl. a day from the Clarion sand. A second test had about 5 bbl. a day in the same pay but it was subsequently drowned out by salt water.

Fayette County. — On Chestnut Ridge, the second deepest cable-tool test in the East was bottomed at 8,685 ft. below the Oriskany sand and it was dry through the chert beds and sands. The test was completed in less than 10 months which sets a record for the area. In the shallow area, good gas wells have been completed. Noteworthy is a new lens in Springhill Township about 2 miles southwest of Smithfield in which three wells have been completed in the Injun sand with initial open flow of 1,000,000 cu. ft. of gas with a fine rock pressure.

Greene County.—As usual, Greene County contributed many gas wells from the various horizons and ranging up to several million cubic feet of gas initial. Little new oil resulted. In Monongahela Township and Cumberland Township several Dunkard sand oil shows were found and are being produced.

Lawrence County.—At the beginning of the year, a deep wildcat tested, the Newburg in Slippery Rock Township. There was a small showing of gas only in the Lockport dolomite. It was abandoned.

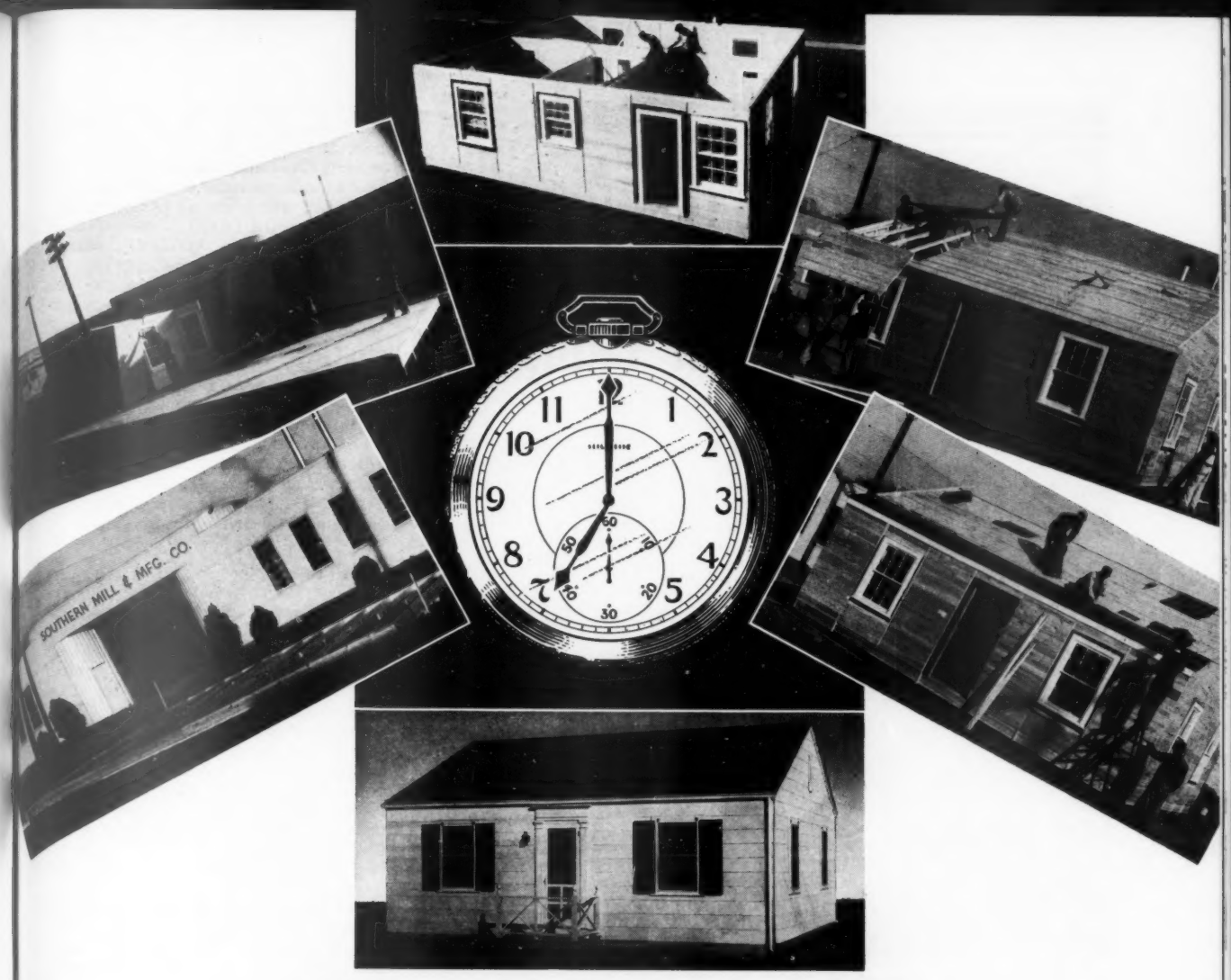
Westmoreland County.—At present

(Continued on Page 206)

SOUTHWEST PENNSYLVANIA

Completions by Months

	Comp.	Oil	Prod.	Gas	Dry
January	26	0	0	22	4
February	13	0	0	12	1
March	25	0	0	22	3
April	17	0	0	14	3
May	28	2	34	17	9
June	32	2	7	22	8
First half 1943	141	4	41	109	28
First half 1942	161	3	170	122	36
Difference	20	1	129	13	8



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Kentucky's Production Rises Following Wildcat Campaign

NEW pools were found in western Kentucky in the first half of this year in Henderson, Daviess and Union counties and a producing horizon new to the Uniontown pool in Union County was uncovered. Sun Oil Co. 4 Uniontown Unit found pay in the Tar Springs sand at 1,890-1,907 ft., the well starting at 119 bbl. per day on the pump.

The Carter Oil Co. opened the Robards pool in Henderson County in January with 1 S. T. Denton, a 100-bbl. well at 2,356-69 ft. Miller & Schiarella, in the same month, opened the Utley pool in Henderson County with 1 Ed. Willett, a 200-bbl. initial producer from McClosky lime at 2,576-81 ft. Carter Oil Co. discovered the Anthoston pool in Henderson County with 1 Henry P. Barrett, a 25-bbl. well in Aux Vases sand at 2,184-89 ft.

March and April resulted in no new pools but in May the Morganfield pool was opened by Trans Tex Producing Co. et al 1 C. T. Newman, which started at 122 bbl. a day from Mansfield sand at 1,428-45 ft. This well was drilled to 2,751 ft. and was plugged back to 1,448 ft.

In June the Poole field was opened in Henderson County by Iley Browning et al 1 Strum, a 50-bbl. well in Tar Springs sand at 1,961-76 ft. Miller & Schiarella opened the Panther pool in Daviess County in Bethel sand at 1,833-37 ft., the well starting at 175 bbl. a day. Carter Oil Co. discovered the Cairo pool in Henderson County in 1 Cottingham, which pumped 119 bbl. initially from Waltersburg sand at 1,890-1,907 ft.

WESTERN KENTUCKY
Completions by Months

	Oil	Prod.	Gas	Dry	Footage
January	8	736	1	6	29,550
February	20	5,656	0	9	57,420
March	18	2,940	1	7	50,700
April	12	2,282	2	7	41,370
May	10	1,501	0	15	49,175
June	18	2,705	0	22	79,120
First half 1943	86	15,820	4	66	307,335

EASTERN KENTUCKY
Summary of Wells Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Clay	2	0	0	2	0
Floyd	13	0	0	12	1
Johnson	3	0	0	3	0
Knott	15	0	0	14	1
Magoffin	6	4	34	2	0
Martin	22	12	100	9	1
Pike	44	2	56	34	8
Total	105	18	190	76	11

Completions by Months

	Comp.	Oil	Prod.	Gas	Dry
January	8	4	72	4	0
February	12	2	16	8	2
March	29	3	19	23	4
April	21	3	25	15	3
May	15	3	25	11	1
June	19	3	33	15	1
Total	105	18	190	76	11

Penn Grade Field In Muskingum County

THE most promising discovery in Ohio during the first half of this year was the large Pennsylvania Grade oil well found in Falls Township, Muskingum County. This well, along with the scattered wells in the eastern part of Newton Township and Madison Township, Perry County, and extending south to the Clayton pool, opens up a large potential producing area. Few Clinton sand oil wells were drilled outside of this area and the Clayton pool, and no important discoveries were found. The majority of the Clinton oil wells were drilled in the Clayton pool, which has extensions to the north and east, and continues active. All Corning grade pools are largely inactive due to the price of oil and increased drilling costs.

Demand for Gas

The emphasis in Ohio is on gas, so vital now to the war industries. A number of discoveries and extensions were found which opened up additional drilling areas. In Ashland County two wildcats were drilled, one finding gas and the other being dry. Indication of a Newburg pool was found in Cuyahoga County after a deeper test to the Clinton sand proved unproductive. Guernsey County had two Clinton tests, both of which were dry. Two pools were found in Holmes County to the east of the present production. A test in Jackson County proved successful. A gas well was found in Knox County between two old pools by a test in the northeast part of the county.

Tests in Lake and Licking counties found the sand unproductive. A new pool was found in Lorain County between the prolific Pittsfield and Wellington pools. Another outlying test west of the Pittsfield pool found the sand missing. A test halfway between the Hinckley and Granger pools in Medina County found gas, indicating a connection of the two pools. A deep test in Meigs County to the Trenton limestone found no shows of either oil or gas. Eastern Morgan County had two wildcats, one of which made a small gas well. Two other wells are now drilling to further test this area. Tests in southeastern Muskingum and northern Noble counties were unsuccessful.

Perry County

Perry County, now producing in many areas, had three discoveries, two Clinton and one shallow. Two extensions to the Sandyville field in Stark County found gas, while a third in the southwest corner was dry. The Hinckley pool was extended over into Summit County by a test a mile across the county line. Of the two wildcat tests in Tuscarawas County, one was dry and the other a small gas well, which has not encouraged further drilling in the area. A test to find another pool east of present producing area in Wayne County was found to be dry.

The Muskingum-Morgan gas field is active with extensions to the north, east and south. The Ashland field continues active with the drilling concentrated in the proven areas. The Sandyville field has a large proven area in which a number of wells have been completed this year. The Lorain County Clinton gas area is the most promising at this time, with drilling in three pools. This area not only produced the largest amount of initial production of any area in the state this year, but also produced the largest Clinton well found in the state in a number of years. The Wheeling-Oriskany sand pool in Guernsey County continues active with a number of nice completions.

OHIO
Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	54	7	28	19	147,747
February	53	7	29	17	148,914
March	74	9	37	28	198,790
April	62	10	35	17	150,142
May	74	10	36	28	194,921
June	84	11	36	37	196,229
Total	401	54	201	146	1,036,743

Recompletions—Oil 1, Gas 6, Dry 1.

Summary of Wells Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Ashland	12	0	0	7	5
Athens	40	1	8	18	21
Coshocton	11	2	88	4	5
Cuyahoga	2	0	0	1	1
Fairfield	3	0	0	2	1

County—	Comp.	Oil	Prod.	Gas	Dry
Gallia	1	0	0	1	0
Guernsey	14	2	12	8	4
Harrison	1	1	1	0	0
Hocking	1	0	0	1	0
Holmes	14	0	0	7	7
Jackson	1	0	0	0	1
Jefferson	1	1	2	0	0
Knox	11	3	29	2	6
Lake	1	0	0	0	1
Lawrence	3	0	0	1	2
Licking	6	2	27	2	2
Lorain	22	0	0	12	10
Medina	26	2	74	18	6
Meigs	16	1	15	10	5
Mercer	1	0	0	0	1
Monroe	10	2	22	6	2
Morgan	41	2	3	26	13
Muskingum	24	3	738	12	9
Noble	20	2	21	8	10
Perry	56	27	2,209	14	15
Richland	1	0	0	1	0
Stark	16	0	0	13	3
Summit	6	0	0	4	2
Tuscarawas	7	0	0	4	3
Washington	17	3	7	7	7
Wayne	16	0	0	12	4
Total	401	54	3,256	201	146

Summary of Wildcats Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Ashland	2	0	0	1	1
Cuyahoga	2	0	0	1	1
Guernsey	2	0	0	0	2
Holmes	2	0	0	2	0
Jackson	1	0	0	0	1
Knox	1	0	0	1	0
Lake	1	0	0	0	1
Licking	1	0	0	0	1
Lorain	2	0	0	1	1
Medina	1	0	0	1	0
Meigs	1	0	0	0	1
Morgan	2	0	0	1	1
Muskingum	2	1	550	0	1
Noble	1	0	0	0	1
Perry	3	0	0	3	0
Richland	1	0	0	1	0
Stark	3	0	0	2	1
Summit	1	0	0	1	0
Tuscarawas	2	0	0	1	1
Wayne	1	0	0	0	1
Total	32	1	550	16	15

Two Small Fields Found in Indiana

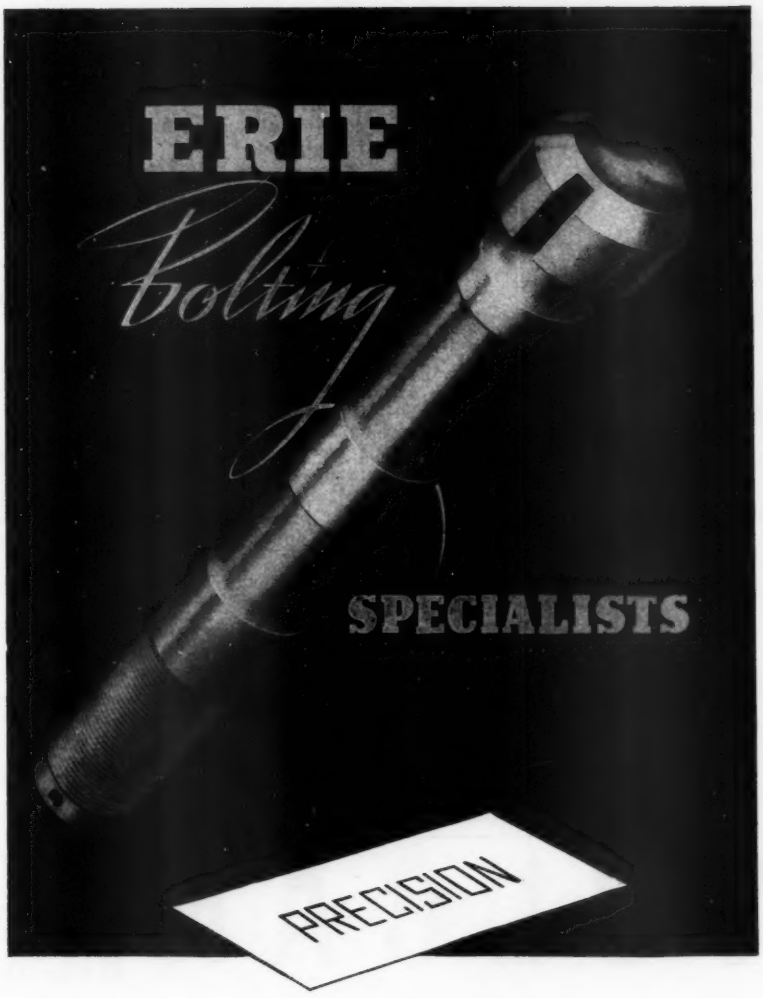
THE Rogers pool in Posey County was one of two new fields opened in the first half of 1943 in Indiana but the discovery well was the only one in the pool at the close of the half year. It produces from Clore sand at about 1,900 ft. The other discovery was the North Owensville pool in Gibson County, where the McClosky lime was found productive thus far in three wells. No dry holes had marred the record of the two pools.

Field work compared with the same period last year fell off nearly 49 per cent this year but the dry hole percentage was very much smaller than in the same period last year only 57 failures having been reported as against 117 in the first half of 1942. The bulk of the work was in Posey, Gibson and Vanderburgh counties.

INDIANA

Summary of Wells Completed First Half of 1943

County—	Comp.	Oil	Prod.	Gas	Dry
Daviess	2	2	8	0	0
Dearborn	1	0	0	0	1
Decatur	2	0	0	2	0
Elkhart	1	0	0	0	1
Fountain	1	0	0	0	1



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County—	Comp.	Oil	Prod.	Gas	Dry
Gibson	24	15	1,134	0	9
Harrison	3	0	0	2	1
Henry	1	0	0	1	0
Jasper	1	0	0	1	0
Jay	2	1	2	0	1
Knox	3	1	105	0	2
Lake	1	0	0	0	1
Laporte	1	0	0	0	1
Marshall	1	0	0	0	1
Pike	2	0	0	0	2
Posey	34	12	694	1	21
Randolph	1	1	2	0	0
Scott	1	0	0	0	1
Spencer	7	2	210	0	5
Vanderburgh	14	9	525	1	4
Warrick	1	0	0	0	1
Wayne	2	0	0	0	2
White	1	0	0	0	1
Total	107	43	2,647	7	57

Completions by Months

Month—	Comp.	Oil	Gas	Dry	Footage
January	12	4	3	5	16,451
February	28	12	1	15	52,242
March	23	12	0	11	46,560
April	12	3	2	7	16,284
May	19	8	1	10	31,098
June	13	4	0	9	19,068
First half 1943	107	43	7	57	181,703
First half 1942	207	80	10	117	359,479
Difference	100	37	3	60	178,776

Eastern Fields

(Continued from Page 202)

in Derry Township, a wildcat on the Chestnut Ridge anticline is nearing 6,000 ft. in its way down to the Oriskany. Another in Ligonier Township is running low with the Onondaga lime topped at 8,451 ft.

Maryland.—On the Accident dome in Garret County, one deep test was abandoned when it was found running low when the Burkett shale was reached. This made the third deep test on the structure. Another test has started.

WEST VIRGINIA

New oil discoveries in West Virginia were entirely lacking. For a time heavy distillate yields in some of the Oriskany tests in Ripley district, Jackson County, gave rise to speculations as to probably deep sand oil. These all proved disappointing. Over this area, many good shallow sand gas wells were reported. In the Oriskany fields, completions are fewer and of less initial volume but many are still fair wells.

Kanawha County.—The Big lime pool in Poca district was extended some and a little new oil added. In Union district there was some Big lime gas which gaged up to over 5,000,000 cu. ft.

Mason County.—A deep wildcat in Union district drilled through the Clinton sand with Oriskany, Newburg and Clinton sands dry.

McDowell County. — In Browns Creek district, a deep test found the Oriskany dry.

Pleasants County. — In Union district, a deep test had a showing of gas in the Oriskany sand but was abandoned and no further work started.

Putnam County.—In Pocatalico district, the Big lime is getting a play with two completions showing from 1 to 3 million cubic feet gas.

Raleigh County.—A deep test in Marsh Fork district found the Oriskany sand dry. The area is being drilled for Big lime gas.

Ritchie County.—The largest well for the 6 months was brought in in Clay district and was good for about 50 to 100 bbl. a day. The area is well drilled, however.

Tucker County.—In Dry Fork district, a deep test is being drilled on a very prominent structure southeast of Davis, W. Va., and the Appalachian Frontier. It is one of the most interesting and is now below 7,000 ft.

Wirt County.—Another Oriskany

WEST VIRGINIA

Completions by Months

	Comp.	Oil	Prod.	Gas	Dry
January	32	2	3	22	8
February	49	14	137	29	6
March	44	6	47	31	7
April	51	6	61	39	6
May	48	5	73	37	6
June	62	8	51	45	9
First half 1943	286	41	372	203	42
First half 1942	379	55	1,259	266	58
Difference	93	14	887	63	16

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See REFINERY COMPOSITE CATALOG Pages 543 to 544

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test is being drilled in Tucker district west of the Caplinger test. It has not reached the Lower Devonian.

Wyoming County.—In Oceana and Huff Creek districts, two deep tests found the Oriskany dry. There are fair Big lime gas wells being completed in the area.

Michigan

(Continued from Page 197)

tial production of 337 bbl. in 19 hours. The production was a surprise as the well had been regarded as a 50-bbl. well before it was completed.

Production Unequal to Demand

Production in Michigan fell short of demand by refiners and pipe-line companies throughout the first half of the year. At the close of the half year pipe-line nominations for July totaled 65,480 bbl. per day, while the best producers hoped to supply from July well output was 54,368 bbl. per day, which was a considerable increase over June actual production. Stocks in the closing days of the period were around 668,000 bbl. indicating a withdrawal from storage of 477,000 bbl., or more than 42 per cent in 14 months.

MICHIGAN

Completions by Counties

County—	Comp.	Oil	Prod.	Gas	Dry
Allegan	15	3	145	0	12
Arenac	9	4	60	0	5
Bay	13	13	999	0	0
Calhoun	1	0	0	0	1
Clare	19	2	43	7	10
Clinton	1	1	50	0	0
Gladwin	10	7	254	0	3
Gratiot	3	1	32	0	2
Isabella	3	1	20	2	0
Kent	3	0	0	0	3
Jackson	4	0	0	0	4
Lake	7	0	0	0	7
Mecosta	8	6	3,295	0	2
Missaukee	15	9	4,087	0	6
Montcalm	3	0	0	0	3
Newaygo	6	3	1,138	1	2
Ogemaw	1	1	25	0	0
Osceola	33	15	9,175	0	18
Ottawa	18	6	621	0	12
Roscommon	6	1	25	0	5
Saginaw	3	1	5	0	2
Van Buren	29	13	961	0	16
Wayne	2	2	15	0	0
Miscellaneous	18	7	475	3	24
Total	246	96	21,425	13	137

Wildcat Completions

County—	Comp.	Oil	Prod.	Gas	Dry
Allegan	5	0	0	0	5
Arenac	1	0	0	0	1
Clare	3	0	0	0	3
Crawford	1	0	0	0	1
Gladwin	1	0	0	0	1
Jackson	2	0	0	0	2
Kalamazoo	1	0	0	0	1
Kent	1	0	0	0	1
Lake	1	0	0	0	1
Lapeer	1	0	0	0	1
Missaukee	2	0	0	0	2
Montcalm	1	0	0	0	1
Newaygo	4	2	730	0	2
Osceola	2	0	0	0	2
Ottawa	1	1	365	0	0
Roscommon	1	0	0	0	1
Saginaw	1	0	0	0	1
Van Buren	3	0	0	0	3
Wayne	1	1	5	0	0
Total	33	4	1,100	0	29

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	34	19	1	14	92,414
February	29	12	0	17	83,178
March	46	19	0	27	116,606
April	34	11	1	22	97,978
May	33	13	1	19	96,155
June	70	22	10	38	166,428
First half 1943	246	96	13	137	486,403
First half 1942	333	170	28	135	856,014
Difference	87	74	15	2	369,611

Mississippi

(Continued from Page 194)

would have an important Tuscaloosa sand oil well. Although not confirmed, it was reported that Gulf Refining Co.'s wildcat on the Alden Davis farm, 16 miles northwest of Waynesboro in Wayne County, had penetrated 100 ft. of oil sand at 6,760 ft. Also in prospect, was the state's first Wilcox sand well. This was the California Co. 1 Natural Gasoline Co. in 52-7n-1w, Adams County. Drilled to below 8,000 ft., oil was reported in cores taken in the Wilcox between 4,000 and 4,200 ft.

At the first of the year, and what at the time was considered to be the most important wildcat strike since the Tinsley field was opened in Yazoo County in 1939, the Pure Oil Co. 1 McDowell, 6 miles southwest of Natchez, in Adams County, started flowing through perforations in the Tuscaloosa formation at 10,281-85 ft. The oil was of high gravity, testing 47.8°. The highest rate of flow was given as 360 bbl. a day through ¼-in. choke. The flow continued under high gas pressure until tests at lower levels ruined the hole and allowed salt water to intrude. According to last reports whipstock was set just below 10,000 ft. for a new hole.

MISSISSIPPI

Completions by Months

	Comp.	Oil	Gas	Dry	Footage
January	1	0	0	1	10,405
February	3	0	0	3	14,477
March	10	1	0	9	68,806
April	11	4	0	7	64,914
May	1	0	0	1	10,502
June	15	3	0	12	62,952
First half 1943	41	8	0	33	232,056
First half 1942	37	17	0	20	188,210
Difference	4	9	0	13	43,846

BOOK REVIEW

Company Museums. By Laurence Vail Coleman. Published by the American Association of Museums, Washington, D. C., 174 pp., $2.50.

This is a book for business men. Its main purpose is to show the nature and usefulness of company museums, but it may also serve as a guide for people who have museums of this kind to manage. Company museums are museums belonging to industrial corporations, commercial houses, railroads, public utilities and other concerns. These museums are used for business reference and public relations.

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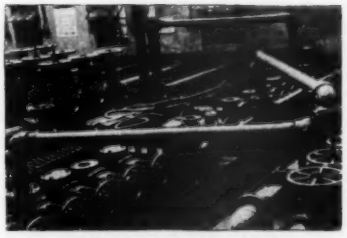

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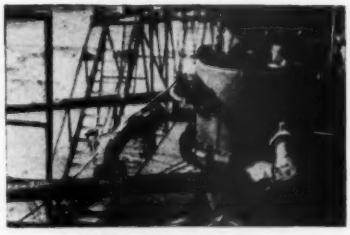

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Crude Ceilings May Yield

by M. Stanley Norman

Current posted prices for crude oil, including the scattered and local changes during the first 6 months reviewed in this report, were published in the July 15 issue of the Journal, starting on page 112. Complete postings for all major fields are published each month, usually in the second issue for the period. This review not only gives details and dates of each change in the ceiling prices authorized by OPA during the first half but relates pertinent developments in the unsuccessful effort of PAW, industry associations and individual operators to obtain a general advance of at least 35 cents per barrel.

YIELD point in the resistance of the Office of Price Administration to higher ceilings on crude oil—not as scattered concessions to local fields but on a nation-wide basis—was believed by producers to be in prospect for the second semester. New data are being added weekly to the contention of producers that higher prices are the only assured corrective for failure of discoveries to balance current withdrawals and establish the desired reserves for a protracted war.

Failure of the industry to show a more direct relationship between prices of crude oil and the rate of exploratory drilling and, hence, discoveries, has been the chief obstacle. Much of the first half year was spent by individual producers, industry associations, the Petroleum Administration for War, and Congress in attempting to convince OPA that without higher prices exploratory drilling would lag and without wildcat wells reserves and producing capacity would not keep pace with essential civilian and military demands.

Alternate Subsidy Rejected

Eloquent arguments for higher prices were made to OPA. But the price agency countered with proposals for subsidized exploratory drilling and, currently, is reportedly leaning toward selected adjustments of field postings, favoring high-cost secondary-recovery operations. Granting that secondary-recovery operators are entitled to higher prices, the rank and file of producers argue more vehemently than ever that increased revenue must be applied to the less costly production as well, if the industry's supply of venture capital is to be increased sufficiently to raise the level of exploratory drilling.

Hardly any proposal in the modern history of the oil industry has been so uniformly condemned as OPA's suggestion of subsidies for wildcat wells. The OPA proposed to finance exploratory wells, retaining one-fourth overriding interest in producers, unless the operator elected to liquidate his indebtedness to the Government by paying $7 to $1 of federal funds advanced. Dry holes would cost the operator nothing since the entire cost would be absorbed by the Government under the OPA's suggestion.

The industry rejected the subsidy proposal, calling it the entering wedge to complete government ownership and pointing out that it practically placed a premium on dry holes. The openings that such a system would afford for the inexperienced and unskilled was repugnant to the oil industry, and its leaders expressed their objections in the strongest terms.

General advances were approved by the OPA during the first half of 25 cents per barrel on California's heaviest crudes, 4 cents in North Texas, 7 cents in the Texas Panhandle and 15 cents per barrel on Wyoming black oils. The other soft spots yielding in the OPA crude-price ceilings during the first 6 months were in local and comparatively small, somewhat isolated fields. In all instances, OPA officially labeled the price-ceiling modifications as adjustments and justified them chiefly by the explanation that postings in the affected fields were at subnormal levels when the freezing order was issued. Consequently, a large percentage of all crude oil is currently selling at prices prevailing October 1, 1941, effective date of the freeze.

The U. S. Tariff Commission report on the cost of producing crude oil, issued January 27, 1943, became the foundation upon which OPA rested its resistance to pleas for higher prices from the industry and from its contemporary agency, the PAW. The Tariff Commission's report covered average costs of production from varied percentages of fields and properties for 1939, 1940 and the first 9 months of 1941. The industry's attacks on the concept that the Tariff Commission report was a suitable basis on which to project price policies received slight recognition from OPA. Arguments that costs have risen substantially since start of the war and that the Tariff Commission report was obsolete, incomplete and therefore unacceptable as a yardstick for current operations were rejected in whole or in part by OPA "specialists."

Assertions of OPA that producing units are continuing to profit under existing conditions are true, oil men admit, except that they do not tell the whole story. With drilling operations at hardly more than 50 per cent of the peacetime norm, it is obvious to producing companies that much of the profit shown in 1942 and through the first half of this year is because of curtailed expenditures for development and exploratory wells.

Congress Joins in Fight

Several congressional committees joined the fight for higher ceilings on crude oil during the first 6 months and oil men became practically convinced that Congress offers the chief hope for relief. Just how much influence the congressional committee's recommendations will have on the final decision of OPA, the director of economic stabilization, the director of the Office of War Mobilization, and the White House remains to be disclosed during subsequent months. The fact that at least four of the administration's war agencies, including the highest executive authority in the land, must be convinced of the propriety of higher crude ceilings magnifies the problem to proportions considerably greater than existed at the start of the drive.

Increases ranging from 5 to 13 cents per barrel in selected fields in Texas, Arkansas, Louisiana and Kentucky were authorized February 3 by the OPA. Fields to which the advance applied were Rincon, Shields in Starr and Nueces counties, Texas; McKamie, Dorcheat, Macedonia and Big Creek in Lafayette and Columbia counties, Arkansas; Olla, Little Creek and South Olla in La Salle Parish, Louisiana, and in the Sebree field, Webster County, Kentucky.

Heavy black oil produced in several Wyoming fields were increased 15 cents per barrel by authorization of OPA, effective February 26.

The nearest semblance of a general

advance was authorized in California's heavy fields March 26. Crude of 15-gravity and below was increased 25 cents per barrel. The new maximum prices established by OPA were permitted in only 20 fields when the order first became effective but on April 12 the higher ceilings were extended to a state-wide basis. Higher maximum prices for lighter gravities were permitted, if the posted price fell below the adjusted ceiling.

The first specific recommendation for a price advance of 35 cents per barrel for crude on a nation-wide basis was transmitted by Petroleum Administrator Ickes to Price Administrator Brown under date of April 7. In his recommendation, Administrator Ickes called attention to the failure of exploratory drilling to discover the required amount of new production. He pointed out that inducements must be substantially increased to attract the necessary amount of venture capital and that the incentive of greater emoluments had proven effective throughout the history of the industry.

Rejection Considered 30 Days

Formal rejection of the PAW plea was made in a memorandum dated May 4 from Prentiss M. Brown, price administrator, who at that time suggested the subsidy program for financing exploratory drilling.

An advance in the ceiling price for crude oil of 4 cents per barrel was authorized May 22 in North Texas, North Central Texas and in the Red River bed fields of Tillman County, Oklahoma. This OPA-sanctioned adjustment elevated North Texas grade crude to parity with oil of similar quality in the Mid-Continent. Thus, a contention of several years' standing was finally resolved in favor of North Texas producers. Operators in North and North Central Texas had long contended that their production, comparable in all qualities to Mid-Continent crude, suffered undue discrimination because of earlier transportation conditions that had long since disappeared.

Increases of 11.44 cents per barrel on Tinsley (Mississippi) crude, lifting 40-gravity oil in that field to $1.18, and of 10 cents per barrel in the Ville Platte field, Louisiana, were authorized May 22.

The last significant modification of the crude-price ceiling occurring during the first part of the year applied to all Texas Panhandle production. OPA granted an increase of 7 cents per barrel, effective June 16, lifting 40-gravity crude and higher to $1.22 per barrel.

Although OPA petroleum-price regulations were confined to application of ceilings on the industry's markets they also acted as a floor in most instances. There are no instances on record of crude purchasers failing to post the increase authorized by OPA.

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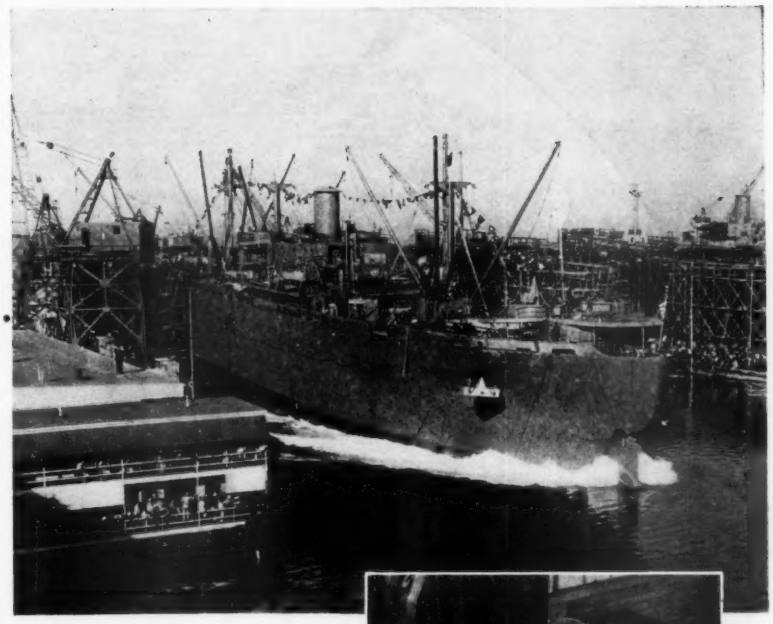

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Consumer Prices for Oil Cling to Flat Curve

CONSUMER prices for motor fuel which despite relatively severe depression of manufactured volumes, remains the chief revenue producer for the petroleum industry, clung to a virtually flat curve during the first 6 months. And there is no tangible indication that any substantial piercement of the current price ceilings will be countenanced by federal economic officials in the near future. The future of consumer prices, however, depends largely on developments in crude-oil ceilings.

The average service-station price for regular motor fuel, predicated on postings in 50 representative cities throughout the country, stood this week at 20.48 cents, including 5.97 cents of state and federal taxes. Net price realized by marketers, therefore, was 14.51 cents per gallon, slightly more than 1 cent per gallon above the average for the last prewar year of 1941. The net dealer average is about 11.01 cents.

Comparison with last year's averages shows conclusively that the petroleum industry has received no price adjustments to compensate for the complex increases in operating costs under a wartime economy. The rise of a little more than 1 cent per gallon occurring in consumer gasoline prices since 1941, the last peacetime year, has been more than offset by rising transportation costs, leaving no cushion whatever for absorbing higher service-station wages and the much increased intangible cost of mobilizing and training replacements for marketing personnel drained out of the industry by Selective Service and the economic appeal of war industries.

Fourth of Outlets Closed

Approximately 25 per cent of the prewar retail outlets have been closed for the duration. This mortality rate of service stations threatens to increase if tighter rationing restrictions are imposed in all or part of the 31 states outside the eastern shortage area.

Attempts to ameliorate rising overheads of service-station operators were behind the federal order limiting hours of dispensing gasoline at all retail outlets, except a few to serve commercial vehicles. Resistance to the restrictive order was mostly local. Operators, in general, welcomed the regimentation of consumer habits, forcing automobile drivers to make their gasoline purchases at hours established primarily for the convenience of marketers rather than for the purchasers.

The Office of Price Administration, chief government bureau exercising jurisdiction over the operation of service stations, permitted a leveling off of service-station postings at the range of established marketers. This policy had a tendency to elevate prices of the independent operators, frequently supplied from small local refineries or in tank-car lots by non-integrated manufacturers. The so-called cut-rate stations, consequently, have enjoyed a disproportionate share of the leveling-off process arising from higher costs. However, most of the cut-rate outlets relied heavily in the past on large volumes of business and comparatively low overhead costs and were, as a result, content with a lower margin of profit. Diversion of available manpower to the armed forces and war industries has brought virtual parity between the operating costs of all service-station outlets and rationing has spread the volume of business more nearly equal to density of population.

Driver Habits Changed

Consumers in general have discontinued their prewar habits of driving several blocks, or perhaps miles, to save 10 or 15 cents on a tank full of gasoline. Rationing has made mileage too precious, even in the least restricted areas, to indulge in penny pinching, if the saving involves unnecessary driving.

Complete statistics are not available, but sample checks with representative marketers disclose another pronounced trend in consumer habits directly attributable to the war. Limitation on civilian consumption of gasoline has had the psychological effect of converting a larger percentage of drivers to luxury products. Consumers obviously follow the reasoning that premium motor fuels will give them more miles and superior engine performance than the same rationed volume either of regular or third-grade gasoline. Conditions are subject to local variations, but in general the octane number of all three grades of gasoline have been depressed from 1 to 3 points since the war started, placing even more emphasis than usual on premium motor fuel.

The most desirable base stocks of gasoline currently are earmarked for production of aviation motor fuel. Adjustments of processing operations at numerous refineries to recover the maximum quantity of aviation gasoline, synthetic-rubber components and other war products have tended to slightly degrade the fractions remaining for civilian motor fuel.

The higher margins accruing to service-station operators through the sale of a larger percentage of premium motor fuel does not nearly equal the lost revenue from the sale of tires and accessories. Essential civilian commodities, ranging all the way from lunch kits for war workers to groceries, have replaced prewar accessories in many of the so-called superservice stations. But for the basic changes in merchandising technique, the inactivated service stations might easily have been in the neighborhood of 50 per cent.

Western Declines Less Abrupt

Margins between tank-wagon and service-station prices, of course, were no more favorable in the less severely rationed sections of the country than in the 17 eastern states and the District of Columbia. However, the relatively smaller reduction in the normal gallonage of Middle West, Rocky Mountain and Pacific Coast outlets gives operations in the 31 states outside the eastern area a distinctly more favorable aspect as long as more moderate conditions prevail.

Figures for the first 4 months indicate a decline of approximately 20 per cent in the total domestic consumption of gasoline for the first half of 1943. Nearly 35 per cent of the decline was concentrated in the 17 eastern states and the District of Columbia while remainder of the country was off about 15 per cent compared to 1942 gallonage. Consumption of gasoline during the first 4 months in the eastern shortage area was around 14,800,000 gal. daily compared to 22,500,000 gal. daily for the same time a year ago. The 17 eastern states and the District of Columbia normally consume about 36 per cent of the nation's total requirements for motor fuel but currently the proportion is about 30 per cent.

AVERAGE SERVICE-STATION GASOLINE PRICES*

(Cents per gallons)

	1943	1942
January	20.43	19.91
February	20.47	20.09
March	20.48	20.04
April	20.47	20.26
May	20.48	20.37
June	20.48	20.37
Six months' average	20.47	20.17
July	....	21.36
August	....	21.29
September	....	20.36
October	....	20.38
November	....	20.37
December	....	20.41
Year's average	....	20.43

*Including 5.97 cents per gallon in state and federal taxes.

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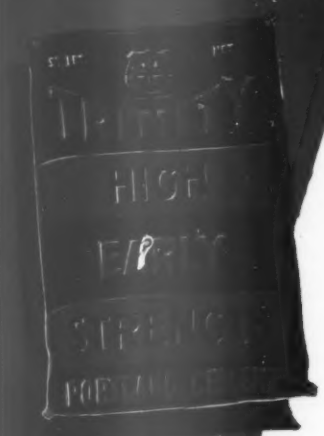

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Refining Efficiency Threatened by Static Weight of Frozen Product Prices

by H. Stanley Norman

THE static weight of price ceilings, preventing the moderate rise that rising costs apparently justify, is becoming an increasingly critical threat to manufacturing operations of the petroleum industry. There were few changes warranting mention during the first half of this year in the basic prices for refinery products, although the absence of peacetime fluctuations in markets has benefited manufacturers to some extent.

In the general process of trimming refinery operations to the minimum dictated by essential civilian and military requirements, the peaks and valleys of production in relation to consumption and, consequently, in inventories too, have been modified since the war started. Shortages of fuel oil in practically all sections of the country, the substantially lower-average level of gasoline stocks and the assurances of increasing demand have combined to eliminate the peacetime urge to move a certain percentage of products contrary to the seasonal markets.

Price Cycles Moderated

Manufacturing costs have risen substantially and the lack of compensatory price-ceiling adjustments long since would have seriously impaired the industry's producing capacity but for the elimination of market cycles which in the past occasionally reached violent proportions. The customary recession of gasoline prices during the winter-consumption lull is not a factor in current refinery operations. Likewise, the ordinary decline of fuel-oil quotations through the summer months is missing. Capacity of the manufacturing branch of the industry to absorb higher costs, according to spokesmen for substantial refiners, has been reached. Consequently, refiners have not been ardent supporters of the producers' fight for higher crude prices, fearing, their representatives contend, that manufacturers would be prevented from passing this increased cost factor on to the consumer.

An increase of 0.14 cent per gallon in the average Mid-Continent refinery price for regular gasoline is indicated by the accompanying table during the first 6 months of this year. Other refinery products, however, in the Mid-Continent, which is representative of the entire Middle West, have been static. The only substantial improvement is shown by natural gasoline which, for the first half of 1943, sold at the average price of 3.5 cents per gallon for 26-70 grade, basis Oklahoma (Group 3). The average price of natural gasoline is 0.66 cent per gallon higher than for the first half of 1942.

Specific Ceilings Spread

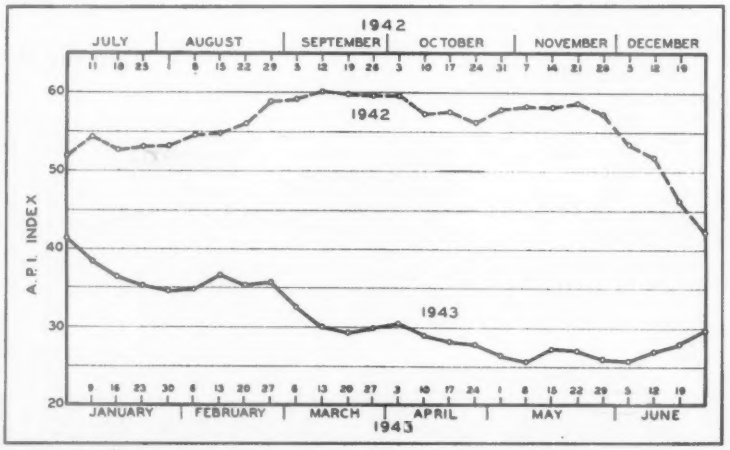
The slight declines indicated in average prices for the first half of 1943 on No. 2 fuel oil on the Gulf Coast and in gasoline on the Pacific Coast is a reflection of the more settled and more specific price ceilings prevailing this year. The Office of Price Administration has materially extended the scope of its dollar-and-cents ceilings during the past 6 months, eliminating some of the uncertainties previously prevailing when the brackets were established entirely by formula.

Refinery markets have been subjected to substantial readjustment and possibly more violent changes are in prospect before the year is finished. Insufficiency of transportation has been the chief factor in readjusting product markets, forcing exchanges wherever possible to the exclusion of crosshauls, duplicated services and other normal results of a competitive system which are profligate of war burdened shipping facilities.

The most deeply seated change in marketing of refinery products resulting from the war is the stimulated use of pipe lines. Completion of the 20-in. products line from the Gulf Coast to the eastern seaboard scheduled for the end of this year will handle 225,000 bbl. of gasoline and light fuel oil daily, the equivalent of 45 to 50 tankers. The impact of the transcontinental product-shipping facility on the peacetime marketing of refined oils is inestimable but refinery operators and marketers concede that it will be almost revolutionary.

Importance of the products line in postwar operations of the industry was emphasized by the vigorous fight made by Middle West refiners against origination of the line on the Gulf Coast. Opposition was dropped after the War Production Board approved use of steel for extending the line to the East Coast. In preliminary negotiations with WPB, the Petroleum Administration for War had specified construction only as far as Seymour, Ind., which Middle West refiners opposed for fear that Gulf Coast plants would capture part of the interior market after the line was no longer needed for military supplies.

Efforts to increase deliveries of fuel oil to the East Coast precipitated an order from the PAW and the Office



The trend of East Coast stocks, reflected by these curves showing the weekly A.P.I. index as per cent of normal supplies, exerted strong influence on all phases of marketing operations, particularly on transportation and availability of products

of Defense Transportation prohibiting the use of tank cars for movement of gasoline from District 2 to District 1. Thus, the agencies hoped to force the use of available railroad facilities for the movement of fuel oils. The ban did not apply to natural gasoline and resulted in a substantial increase through the first 6 months in the movement of this product by tank cars to eastern shortage areas.

One basic change was made in petroleum-product markets by the OPA which revised fuel-oil price ceilings, placing them on a gravity basis, ranging in southwestern plants from 80 cents per barrel for 9.9 gravity and below to $1.27 for 25 gravity and above. The experiment, attempted for the stimulation of fuel-oil production, was first applied January 25 to southwestern refining districts and, on March 3, was made nation wide. Refiners, under the impetus of higher prices, were encouraged to blend surpluses of lighter oils with the heavier residuals and thus end up with greater volumes of burning products.

Much of the benefit accruing to refiners from the disappearing of wide price cycles on a seasonal basis was offset by rather drastic cuts in the permitted production of gasoline, the chief revenue product. District 2 refiners, particularly, were instructed in February to reduce their gasoline production to not more than 70 per cent of the average output during the last 6 months of 1941. Previously, District 2 refiners had been restricted to 80 per cent of their last-half-of-1941 production, and, for a time, operated at a level of 75 per cent of the base period.

In the forepart of May, because of declining crude supplies, District 2 refiners were assigned specific quotas on oil runs to stills and were authorized to increase their production of gasoline to 85 per cent of the average for the last half of 1941. In June, the limit on gasoline manufacture was further liberalized to a factor of 90 per cent, where it now stands.

AVERAGE PRICES OF IMPORTANT REFINERY PRODUCTS TO JULY 1, 1943
(Cents per gallon)

Mid-Continent, Oklahoma (Group 3)	1943	Basis 1942
Regular gasoline	5.94	5.80
Natural gasoline (26-70)	3.50	2.84
Kerosene (41-43)	4.50	4.50
Fuel oil (No. 6)*	87.50	87.50
Crude (36° A.P.I.)	$1.17	$1.17
Gulf Coast		
Regular gasoline	5.87	5.83
Kerosene (41-43)	4.12	3.95
Distillate fuel (No. 2)	3.75	3.88
Residual fuel*	87.50	87.50
Crude (36° A.P.I.)	$1.40	$1.40
California		
Regular gasoline	6.00	6.04
Natural gasoline	4.87	4.75
Kerosene (41-43)	4.75	4.75
Gas oil	5.50	3.38
Residual fuel	$0.85	$1.10
Pennsylvania		
Regular gasoline	6.75	6.75
Kerosene (45)	6.12	6.12
Bright stock†	30.50	30.50
Crude (Bradford)	$3.00	$2.93

*Cents per barrel. †10 pour test.

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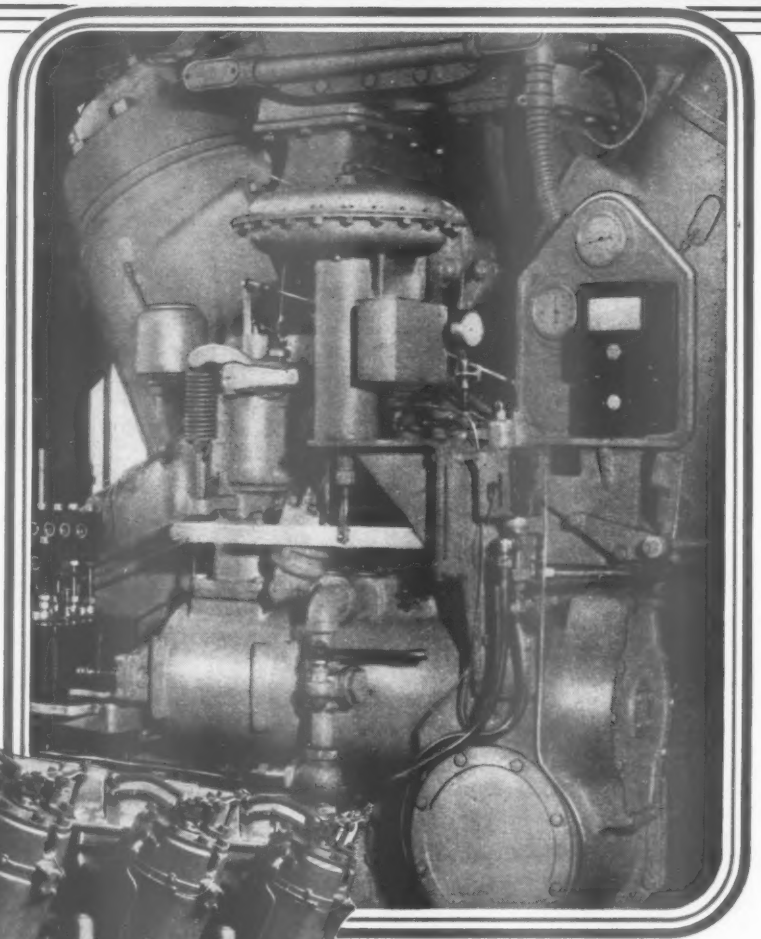

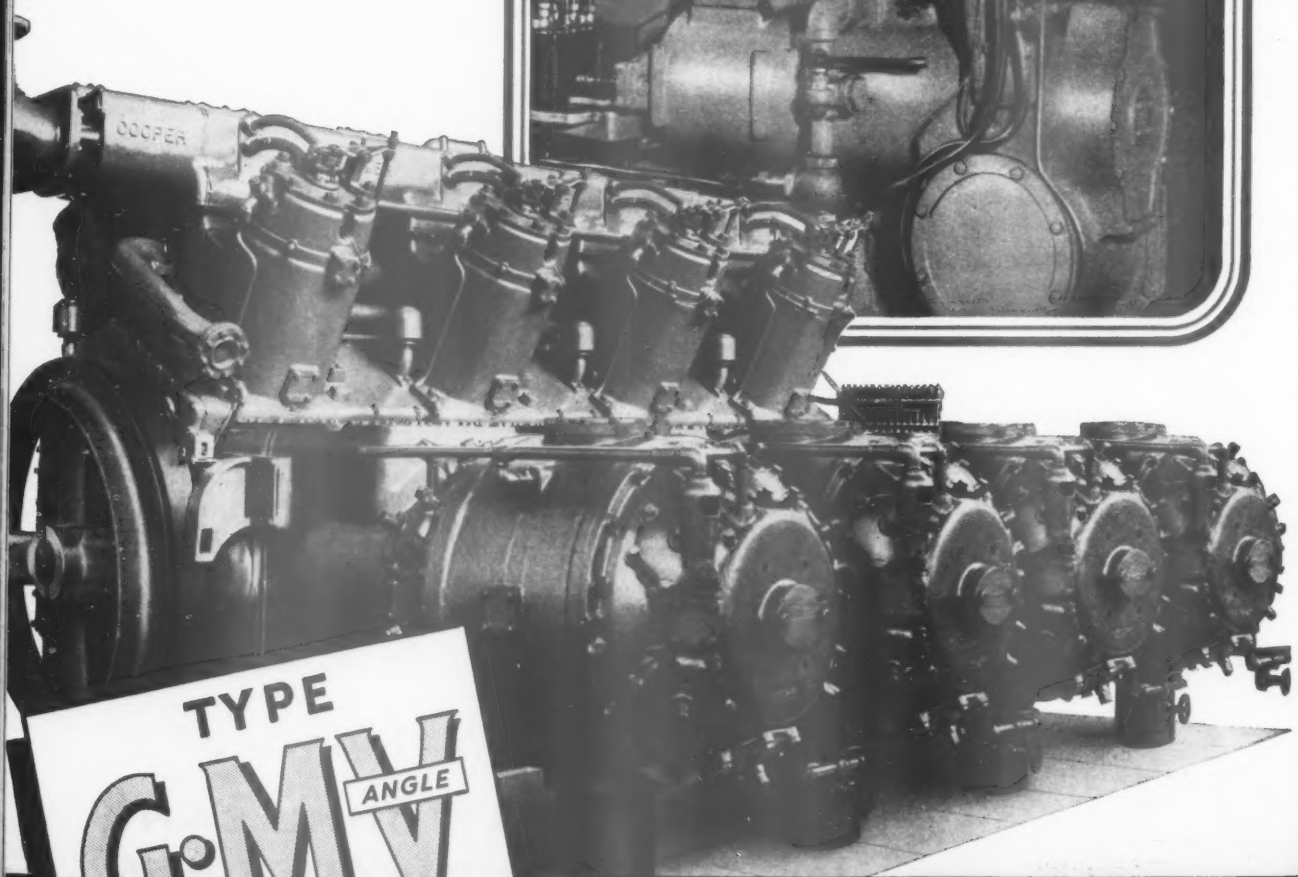

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Bottom-Hole Water Shutoff

by Vic E. Baum

In this article the author, a consulting oil-well-completion engineer, reviews the subject of water coning and outlines a method of overcoming water encroachment

ATTENTION has been focused on the needless handling of large volumes of bottom-hole salt water, which, going on as it does, day in and day out, takes more profit out of the income dollar than any other item of expense. Since the lifting cost per barrel of oil must contain and absorb the entire cost of lifting worthless salt water, operators have been incited to take action to shut off bottom-hole salt water.

To understand the problem of shutting off bottom-hole salt water, one must first visualize the reservoir in its virgin state and then the conditions that exist progressively at given periods throughout the productive life of the well. The reservoir, when originally tapped, would have the three substances of the pay formation arranged according to gravity and density. That is to say, free gas would be at the top of the reservoir condensed to a density equal to the reservoir pressure. Oil would form the next layer, as it would be floating on the water, and water, because of its heavier weight, would be on the bottom.

Cause of Water Movement

What happens when the bit penetrates an oil-pay horizon when the casing is empty? Because of the tremendous pressure differential, that of bottom-hole pressure in the pay formation to zero or atmosphere in the empty casing, the fluid must rush in to the pipe at a rate equal to its capacity at the reservoir pressure (thousands of barrels per hour) which is the inertia that starts the water moving. Perhaps the salt water will not show up in the potential, or perhaps it will not make its appearance for several months, but the fact remains that the water starts moving and sooner or later free water will be produced and thus has one phase been completed (Fig. 1).

Although this writing is intended to deal with the shutting off of salt water after it has put in its appearance, it is deemed not amiss to point out that if a well is drilled in under a fluid load, no differential will exist and the inertia will not be supplied to start the water moving which will prevent salt water from showing up prematurely.

Some operators object to this method of drilling in, as it robs them of the opportunity to judge the rate of fill-up and thereby gain an indication of the well's productivity. This writer puts 5 to 10 bbl. of water on the plug at bottom and then fills the casing with oil to a point higher than the expected bottom-hole pressure so that as the plug is drilled the drawndown can be observed to indicate the productivity. By drilling in with a preponderance of pressure in favor of the casing, the water does not start moving and the well can be placed on production at controlled low rates. It is assumed that my readers understand that drawdown and fill-up can be equally well converted to indicate an estimate of the well's capacity.

The question might be raised "How do we know the water starts moving and finds its way into the bore hole prematurely?" Logically the following facts are offered as an interrogation to your mind. Is it granted that the

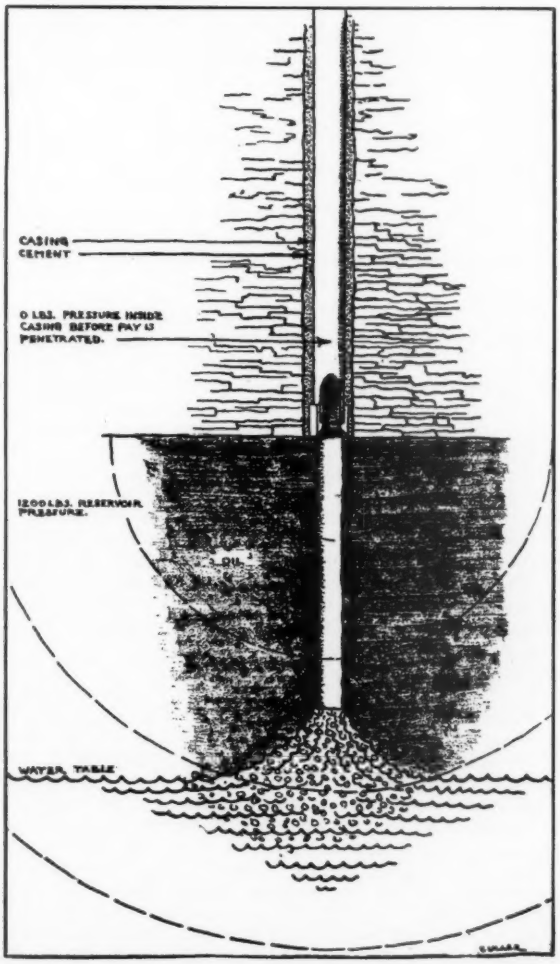

Fig. 1

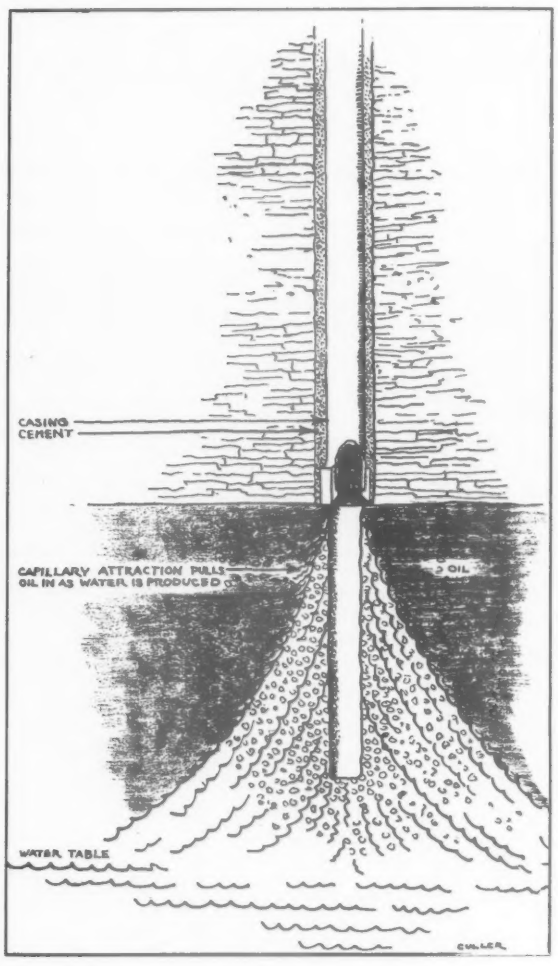

Fig. 2

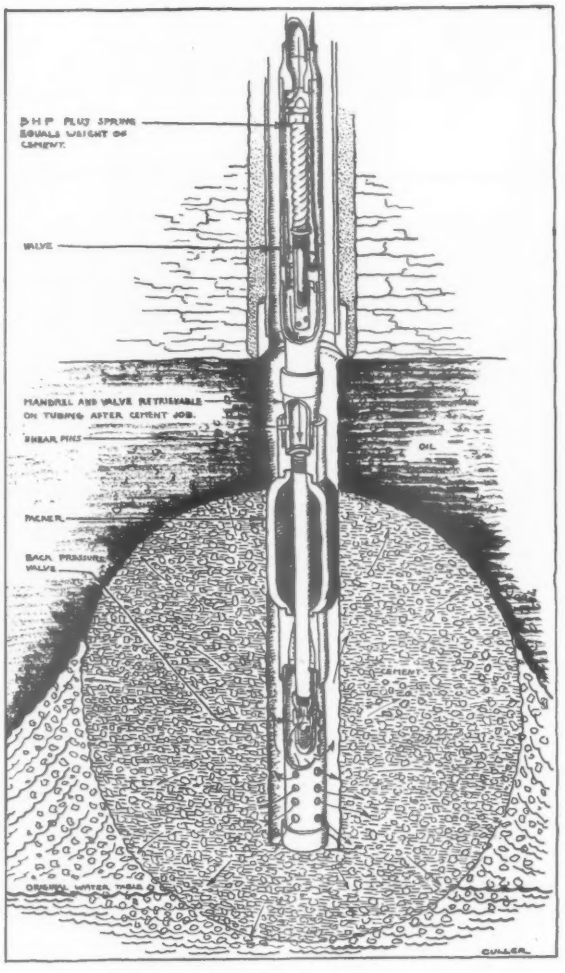

Fig. 3

surface tension of oil is greater than that of water? That the vertical permeability in lime wells is in most cases equal to the horizontal? That all fluid will move to the point of lowest pressure in direct proportion that the fluidity and resistance offered to the flow of the different fluids bears to the pressure behind it? In other words, oil and water in a common resesrvoir is under equal pressure, but as the surface tension of oil is greater than that of water, then it must be admitted that water will move easier, quicker and further than oil at any given pressure within any stated period of time.

Fig. 1 illustrates how the easier moving water has formed a cone by moving up to the point of lowest pressure. The radius lines have been drawn in to give the reader an idea of proportions and to enable him to visualize points of equal pressure. As production of fluid occurs, it is comparatively simple to imagine these lines shrinking so that the included area within each radius line becomes smaller and smaller. It is understood, of course, that the ratio of oil to water is not in direct proportion to the area included within each radius line, as we have yet to consider the lateral movement of the oil due to the pressure exerted by the water compressing the oil against the top of the pay section. The best criterion is a check of the accumulated recovery of oil up to the point free water was first observed and then check the water-oil ratio at progressive periods so that the entire producing life history of the well can be plotted against estimated acre-foot recovery figures.

Formation of Water Cones

An example of this would be to take a well with a known pay section of 30 ft., the pay being penetrated only 20 ft. and the probable recovery being 250 bbl. per acre-foot. Since water generally shows up in the first 12 to 18 months of the well's producing life, it can be instantly seen that under prorated producing conditions the water table has not risen uniformly to justify the appearance of free water. By simple arithmetic the deduction can be made that a cone exists.

In a hypothetical case where the connected voids have the same resistance to flow (uniform permeability) and where there is known to be a water table, all fluid within the area of any size sphere will move equally toward the point of lowest pressure.

To further analyze the condition that exists in the pay formation. The same pressure that is on the water is on the oil, and we must remember that water will flow with greater ease than oil because of its lesser surface tension. With the production of a quantity of fluid a path will be formed for the water. As additional fluid is produced a core of water is pulled up through the center of the sphere until a definite cone exists, extending up from the water table.

We now have a path formed for the water and by capillary attraction at the water-oil contact line of the cone, oil is pulled into the bore hole, which accounts for the often heard statement, "The greater the volume of fluid pumped, the more oil is produced." This statement will hold true for only a very limited period of time,

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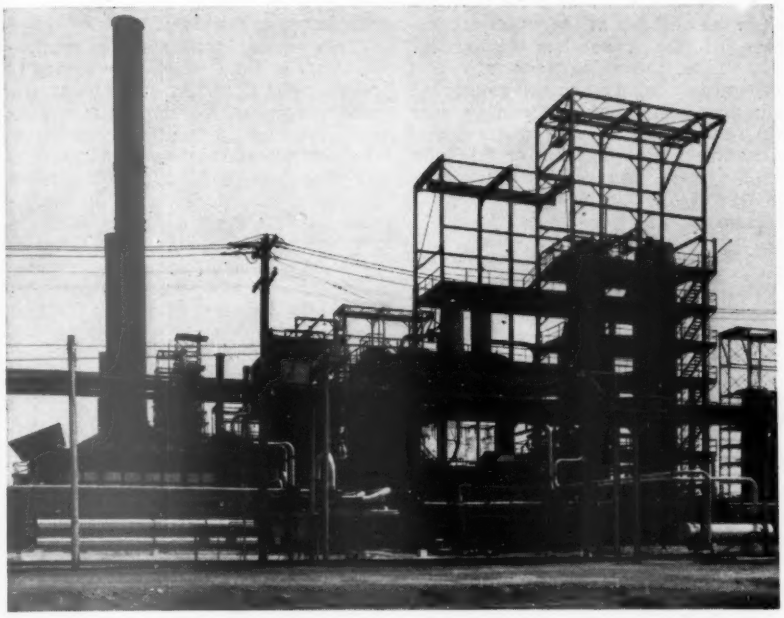


View of Standard Oil Co. of New Jersey cracking plant which operated 4,379 on-stream hours without shutdown

Cracking Coil Completes Record Run

During the 6 months this unit was on stream it cracked over a million barrels of naphtha. This record is attributable to clean, uniform feed stock, high fire box, close temperature control and careful control of release line quench.

by J. P. O'Donnell

THE No. 17 cracking coil at the Bayway, N. J., refinery of the Standard Oil Co. of New Jersey recently completed the longest run ever attained on any coil and fired-soaker reforming unit operated by the company. As far as is known this run, at the same time, established a world's record for this type of unit. The run ended May 29 after slightly more than 6 months of continuous service.

The unit was fired on November 21, 1942, and operated continuously for a total of 4,379 on-stream hours. The run was finally terminated because of a scheduled annual metal inspection and not because of any process difficulties. Tube-wall temperatures and pressures taken just before the shutdown indicated that the unit was still in excellent condition. This conclusion was substantiated as soon as the furnace and release line were opened for cleaning and it was found that they contained negligible quantities of coke.

This report gives a description of the process and a summary of operating conditions maintained during the record run. It also lists those factors which are regarded as the most important in contributing to the long run.

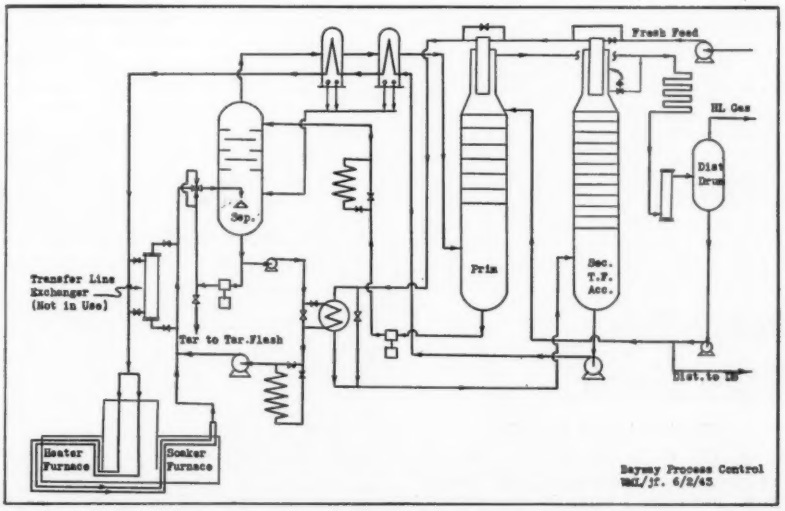
The accompanying diagram shows the flow through No. 17 unit which was originally built as a conventional tube and tank unit. In place of the conventional soaking drum, the unit employs a fired-soaker furnace. This insures maximum temperature during the short soaking period. There are two parallel passes through each coil with the "soaker" furnace in series following the "heater" furnace. The operation, as carried on during the reforming of naphtha, is once-through, coil only.

Specifications of Feed Stock

Feed stock to the unit during the entire run was virgin 300° F. end-point naphtha from sweet crude. This naphtha is fed to the unit exactly as cut at the pipe stills without debutanization. However an attempt is made at the pipe stills partly to debutanize this stock by carrying high distillate-drum temperatures. Under these conditions the stock contains a small percentage of propane and 4 to 7 per cent of butane. Typical feed inspections are as follows:

Gravity, °A.P.I.	67.0
50 per cent at, °F.	220
F.B.P., °F.	300
Octane number (C.F.R.R. '39)	62.0

Cracking of this light stock was



Flow plan of No. 17 cracking coil, Bayway refinery

undertaken entirely as a war-time measure to increase production of aviation gasoline. Under normal circumstances this stock would be utilized in motor gasoline since it would be uneconomical to crack for octane-number improvement alone.

The average operating conditions for the entire run were as follows:

Feed rate, gal. per hour	9,722
Coil inlet temp., °F.	390
Coil outlet temp. heater, °F.	1,070
Coil outlet temp. soaker, °F.	1,105
Coil outlet pressure, lb. per sq. in.	400

Normally the coil outlet pressure would be maintained at about 1,000 lb. The low coil outlet pressure maintained on this run was a wartime measure undertaken to increase the concentration of unsaturates in the butane produced. Because of the low coil outlet pressure it was necessary to operate the unit at a reduced feed rate to obtain the intensity of cracking necessary for maximum butane production. Under the above conditions the octane number of the total C_4 to 400° end-point gasoline produced from this operation averaged approximately 92 (C.F.R.R. '39). This is about the highest octane level at which it was found possible to operate this unit without coil and release line coking.

Factors Affecting Operations

During the 6 months that this unit was on stream it cracked 1,015,000 bbl. of naphtha. From yield data secured on the unit at average operating conditions, the butylene yield from this amount of feed stock was about 91,400 bbl. which is equivalent to 68,600 bbl. of crude selective polymer. Hydrogenated and used as aviation blending stock, this crude polymer is sufficient to produce 150,000 bbl. of 100-octane-number aviation gasoline.

Among the factors contributing to the long run on this unit, the following are regarded as the most importane:

1. Clean, unform feed stock.
2. High fire box, giving more uniform heat distribution and steady coil outlet temperature.
3. Close control of temperatures.
4. Careful control of release line quench. This was controlled to give a temperature of 670° F. maximum after the quench injection point which was found to be well below the coking range for the conversion obtained.

Bottom-Hole Water Shutoff

(Continued from Page 220)

for as the oil is produced, just so is the base of the cone enlarged. Instantly it is realized that if the rate of production of fluid is constant, and the area of the water cone enlarges, then the velocity at the water-oil contact of the cone has diminished. Therefore, the percentage of water becomes ever increasingly greater. A simple example of this can be seen (in reverse) by pouring water out of a tumbler. Note the area or thickness as the water leaves the rim of the glass and how it draws down to a fine stream a foot or so away.

Method of Placing Cement

From the above, it would seem that the prime problem is that of equalizing the unit pressure over a given area so as to compensate for the difference between the surface tension of oil and water. Since water flows with greater ease, then we have to increase the resistance to the flow of water. This can be accomplished by putting out a disk so that when the water attempts to flow in over the top of the disk, it has a greater distance to travel than the oil (which is floating upon the water) and is immediately adjacent to the bore hole. It would be ideal if one could insert a flat disk at the water-hole contact level when the well was first completed, but since any treatment that is applied from the surface must be assumed to take a spherical form, we can merely supply an artificial dividing line by running a formation packer.

It is not wholly sufficient to supply an artificial dividing line by merely running a formation packer, because the placement of the cement underneath the packer must be controlled. It must be realized that the point of lowest pressure is still in the casing and any uncontrolled attempt to place cement would simply have the effect of bypassing the packer, as the pressure of the hydrostatic head of cement would overcome the tendency of this heavier fluid to go out and down in the formation. With a tubing control valve placed at the bottom of the tubing string and immediately above the packer, it is possible to place the cement at the face of the pay at low pressure, ranging from zero to any desired pressure. The tubing control valve is merely a piston-type valve with a logarithmic curve metering pin backed by a heavy coil spring which is set so that the bottom-hole pressure, plus the force of the spring will keep the valve closed when the tubing is filled with cement and displacing fluid. It will be immediately seen that to meter cement at low pressure through the valve and under the packer, one need only exert a low pressure on the tubing at the surface. If the engineers figures are carefully worked out from predetermined bottom-hole pressure data, the pressure applied on the cement ejected through the valve will be exactly that which is applied to the tubing at the surface, calculating, of course, the changes in the fluid column as displacement takes place.

This writer made an exhaustive test of a lime well less than 18 months old that had gone to 92 per cent salt water. A pumping formation packer was set 3 ft. off bottom where the pay formation was penetrated 12 ft. of a possible 30 ft. and produced 100 per cent salt water with a trace of oil. With the pumping packer set 9 ft. off bottom, the well produced 60 per cent oil and 40 per cent salt water as an average over a 24-hour test. Accurate 30-minute gages were kept of both oil and water production and it is interesting to note that the first 2 hours of production the well made 100 per cent oil. The water content, when produced for the balance of the time consumed by the test, prescribed a parabolic curve and it seemed that a projection of the curve would have indicated a continual increase of water content.

A permanent formation packer was run under a tubing control valve and 29 sacks of cement was displaced into the formation (see Fig. 3) which entirely eliminated all water production and under proration conditions this well has not produced any free water since. It might be interesting to state here that the drawdown potential of this well was 12,300 bbl. before the "shutoff" job. After the "shutoff" job the well would make 160 bbl. of oil per day, however, the potential was greater.

Conditions Preventing "Shutoff"

Obviously such a "shutoff" job could not be performed on wells where the following conditions exist:

(a) Drilled to its total depth and reamed with rotary tools.

(b) Where formation is soft or unconsolidated so that packer will not seat.

(c) Where well has been acidized with large volumes of acid.

(d) Where well has been shot with nitroglycerin.

(e) Where pay has been underreamed below the pipe.

Where dependable records have been kept on the completion of the well, and its producing characteristics are known, indicating possibilities of successful treatment, an operator can well afford to spend the money required to shut off bottom-hole water to the end that a larger portion of his income dollar will be profit.

To pay for lifting salt water month in and month out, to say nothing of the added cost of disposing of it, is what many operators have hoped to get away from. Logical reasoning with a small amount of technical understanding should be evidence enough that a new and different technique than general squeezing and dumping of cement is needed to shut off bottom-hole salt water.

PLANT PRACTICES

Dolly for Leveling Columns

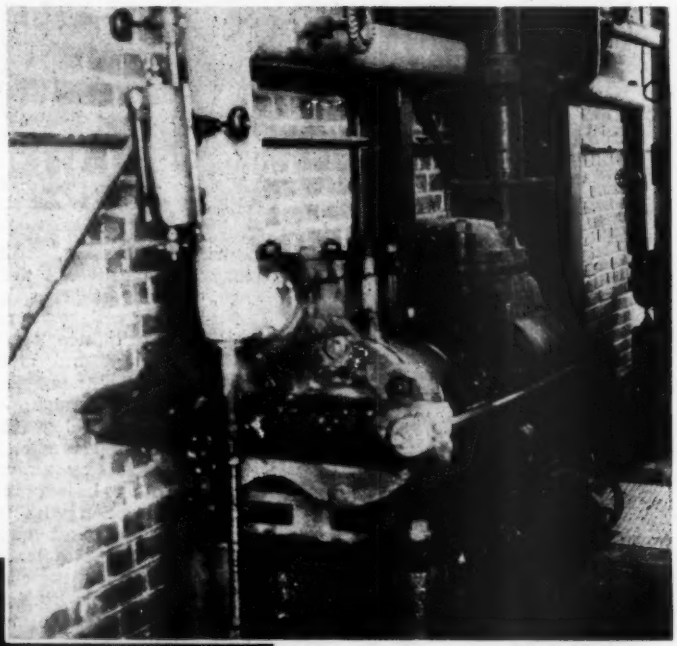
WHEN reconditioning fractionators or other columns, an adjustable dolly is a practical necessity. One California company recently faced with the job of constructing a gasoline plant without recourse to new columns provided the certified welder with dollies for leveling and to permit freedom of rotation while working on roundabout seams. The frame is made in two identical sections forming an arc at the upper edge where a number of equally spaced notches are cut to provide the adjustment by placing the wheels at the proper distance for various diameter vessels. Bails at each end provide means of moving when making the adjustment beneath the column.

Reinforcement for Low-Pressure Pump

WHEN a low-pressure pump is to be employed, because of the scarcity of equipment, in service around its maximum pressure capacity, a safety bracket may be advisable. The bracket can be fashioned by using two short sections of angle iron and two pieces of sucker rods. The angle-iron sections are drilled with holes at each end with the channel facing the pump head. The pieces of sucker rod are threaded at each end to take machine nuts and washers so that the angle-iron sections can be drawn up tight and with uniform pressure across the face of the pump heads.

Dump Buckets Save Time When Sorting Junk

WHEN breaking-out connections from pipe to salvage valuable fittings, the discard is frequently thrown into a pile containing various grades of metal, which must be sorted again before it can be classified as melting stock. If large quantities of such material are worked over, sorting can be done easily at the breaking-out machine and the pipe-threading machine when large dump buckets are provided for the convenience of the workmen. These buckets are made of tank steel with a bail and link so that traveling crane can pick the full ones up and transfer the load to the proper pile of salvage in the material yard. The buckets are distinguished from each other by painting on the bail what is to be placed in the individual bucket. The procedure saves valuable time by making the classification at the shop so that each pile or bin of material in the yard is ready to be shipped to furnaces for remelting.



Crude Desalting Is "MUST" In Good Refining Practice

by Arch L. Foster

ONE of the very undesirable impurities found in large numbers of crudes is mineral salts of different types, most frequently chlorides of sodium, magnesium, and calcium.

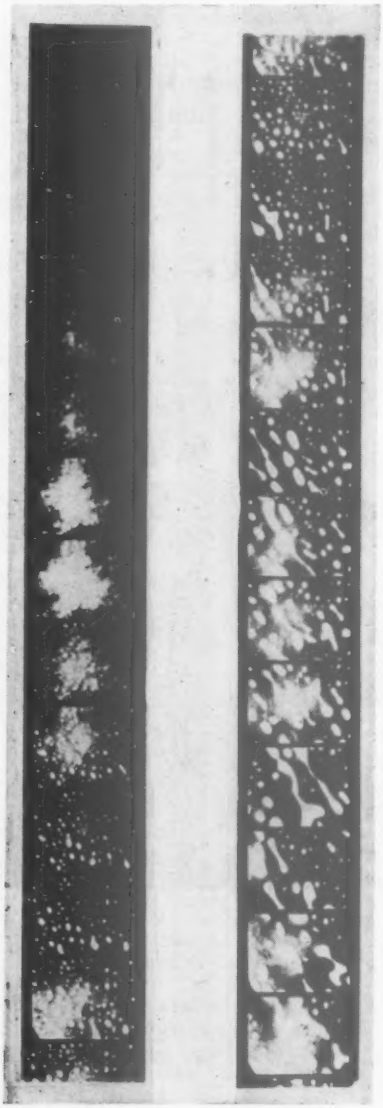


Fig. 1—Motion picture of action of electric field on salt solution in crude oil. Left, top: At the start the emulsified solution is not visible but begins to coalesce. Right: Larger and larger droplets form, solution settles out

During processing sodium chloride may be deposited at the entrance of heat exchangers or in the first tubes of a heating coil, to "burn" and "blister" tubes, induce corrosion, cause more frequent and more expensive shutdowns. The same is true of calcium chloride; magnesium chloride decomposes to release highly corrosive hydrochloric acid, which must be neutralized by ammonia, caustic soda or other base or it neutralizes itself by reaction with metals of the equipment, a most expensive neutralization. The simplest answer is to desalt the crudes prior to processing.

Several means for desalting are employed; raw crude may be treated with relatively large volumes of clean water, heated with exhaust steam, by heat exchange with rundown from distillation process steps, allowed to settle out in tanks from which the salt solution is withdrawn either intermittently or continuously. One of the best known and successful methods is by electrical means.

In electrical desalting methods, the salt-contaminated crude is mixed with more water, passed between electrodes charged at up to 33,000 volts; the salt or salt-and-water particles dispersed in the crude, generally a solution-in-oil emulsion, has its electrical charge neutralized and the droplets coagulate or coalesce to form larger and larger droplets until these are large and heavy enough to settle from the mixture and be removed from the crude, which is then ready for distillation or other processing. An illustration of this operation is given in Fig. 1.

The electrical desalter as designed by Petroleum Rectifying Co., shown in Fig. 2 and diagrammatically in vertical cross-section in Fig. 3, is a vessel capable of sustaining moderately high pressures, is 12 ft. high and 10 ft. in diameter, with somewhat less than 200 bbl. capacity. Two electrodes

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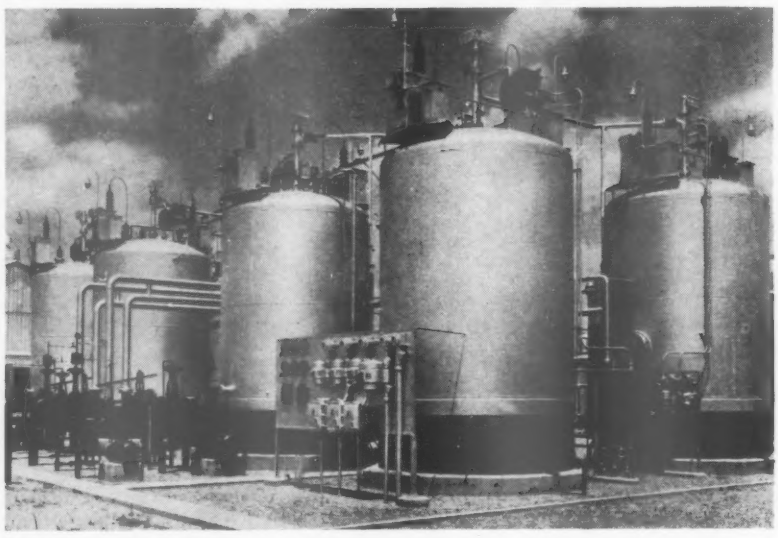

Fig. 2—The first of two additional installations, this 82-unit plant is a model of neatness and efficiency

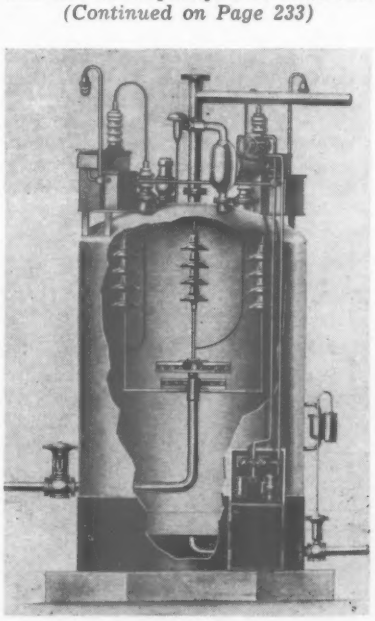

Fig. 3—Typical Petreco electric desalter cutaway view

LET'S GET THIS JOB DONE Now!

● To many little boys, war is just a game to play . . . like "Gangsters," "Indians," or "Pirates."

But to this little boy, war means something different! His daddy has gone away, maybe for a long time . . . possibly forever.

To him war means a lonesome, longing childish heart—a void that only a father can fill.

Yes—we *must* work and fight with every ounce of strength and skill we have—we *must* make far greater sacrifices . . . before this little boy, and many thousands like him, can again have their daddies home.

For all these little boys, then—and their mothers—and their soldier-fathers—LET'S PRODUCE MORE, *FASTER!* They are depending on us for the ammunition, equipment, and supplies that mean a quicker Victory.

The Gulf South is *IN* this war. Its people, its resources, its mighty industries are joined with the rest of America in the grim race to outproduce and outfight our enemies.

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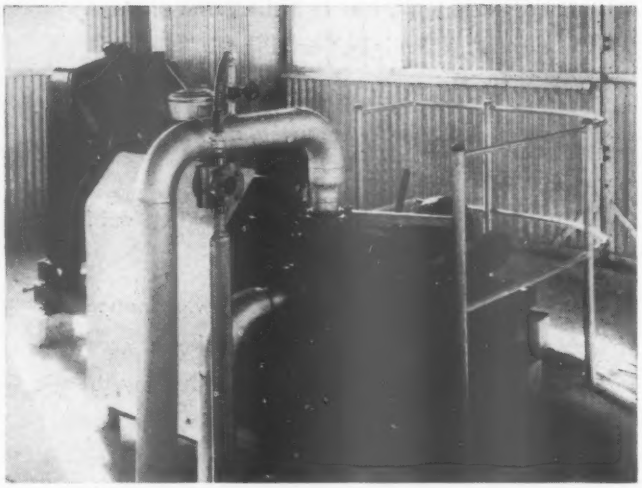
PIPE-LINE SUGGESTIONS

Extension Handle for Wrenches

OPERATORS at the compressor station of one of the major natural-gas pipe lines made an extension handle capable of holding a wrench at either end. The wrenches are held in sockets which are made so that they will accommodate wrenches of numerous types required in the routine of operation and maintenance.



Look Glass on Bleeder Line for Suction Pump

THE bleeder line for the suction pump at the station of an Oklahoma company has a sight glass which enables the operator to avoid wasting oil. While he is bleeding gas and air from the line he can conveniently observe to determine whether oil is also being bled to an extent which is not desirable. The sight glass is connected to the line by a flexible coupling. The bleeder line leads to an enclosed sump.

Container for Gage Tickets

IN a Kansas field, a container has been placed near the road in such a way that the pipe-line gager can pick up the run tickets without getting out of his car. The gage tickets are held in a steel container which telescopes inside a short 4-in. nipple. The container is held up by two little catches, welded to the pipe, which are released when a half-turn is made with the handle at the bottom of the container.

Walkways Supported on Suction Lines

WALKWAYS have been made for the convenience of the gager employed by a products pipe line which are supported on suction lines leading from the tanks to the station. These walkways are made of waterproofed lumber, bolted to the pipe. They enable the gager to go to the tanks in wet weather without getting in the mud and water on the low ground around the tanks. The pipe has provided satisfactory support.

Oil-Well Pumping Practices—No. 5

Fatigue of Sucker Rods

by J. Zaba

This installment opens a discussion of sucker rods. In these the author will treat such matters as stresses, endurance limit, various types of fatigue, stretch, calculation of loads, etc. The first articles in the series on oil-well pumping, which began July 1, covered the behavior of oil reservoirs and a general discussion of sucker-rod pumping systems.

OF all the component parts of a sucker-rod pumping mechanism, sucker rods affect most directly the action and performance of the whole system. Their behavior in transferring the forces and loads involved determines the action of the sucker-rod pump. Their inherent characteristics affect the loads imposed on the surface equipment. The permissible stresses, range of stresses and speed of operation, which a given sucker-rod string can stand, without excessively frequent breakage, limit the economic depth of pumping and the economic capacity of an installation.

Studies of behavior of sucker rods and improvements in their metallurgical properties contributed toward betterment of the economic life of sucker-rod strings. The contribution of studies is two-fold: (1) they help in proper design of sucker-rod strings on new installations, (2) they offer remedies for excessive rod difficulties on installations already in operation. These remedies may be in form of changes of size of sucker-rod pumps, changes in material or size of sucker rods, or changes in characteristic of the pumping cycle.

Practically all excessive sucker-rod difficulties are a result of overstressing and the mechanism of sucker-rod failure is that of fatigue and corrosion fatigue. Before discussing the sucker-rod failures and the causes of these failures, it is advisable to consider briefly certain fundamentals, which have a bearing on the problems involved.

Stresses, Fatigue, Endurance Limit

In a bar subjected to axial loading, the unit stress is expressed by the formula:

$$S = P/A \qquad (1)$$

where:

S = unit stress, or load per unit area, lb. per sq. in.

P = load, lb.

A = cross-sectional area, sq. in.

The unit stress is an average value and does not indicate the maximum intensity of stress in the bar. Depending on axial forces involved, the stress may be tensional or compressional. With given load a decrease in cross-sectional area of the bar results in concentration of stresses.

Practically all materials used in engineering work are elastic. Upon application of a tensile force the bar stretches and returns to the original shape after the load has been removed. The whole science of strength of materials is based on law of proportionality of stress to deformation (Hooke's law). The ratio of unit stress to the corresponding unit deformation of a material is called its modulus of elasticity and is designated by E. Modulus of elasticity is also defined as the imaginary force, in pounds per square inches, which causes deformation equal to the original length of the bar. Modulus of elasticity of steel is usually assumed as from 29,000,000 to 30,000,000 lb. per sq. in.

Hooke's law can be expressed by equation:

$$e = PL/AE \qquad (2)$$

where:

e = elongation

P = load

L = length of the bar

A = area of the bar

E = modulus of elasticity

Since from Equation (1), S = P/A, Equation (2) may be written:

$$e = SL/E \qquad (3)$$

Hooke's law applies only within certain limits. All materials have a so-called elastic limit which is defined as this maximum stress which a given material can withstand without permanent deformation. If the elastic limit of material is exceeded a unit stress is soon reached at which deformation continues with small increase or without increase in load. This unit stress is called the yield point.

If a bar is subjected to repeated applications of loadings, then the possible failure is the result of progressive damage and conditions are that

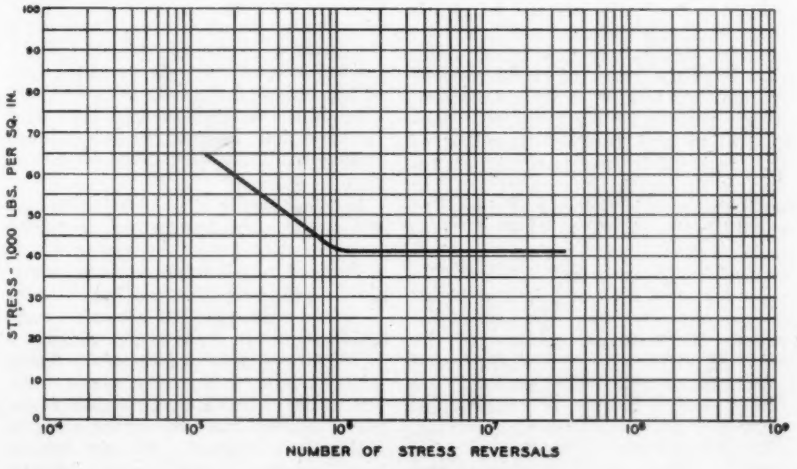


Fig. 1—A hypothetical S-N curve

of "fatigue." Properties of material which denote its resistance to failure under single application of load are not a satisfactory measure of its resistance to fatigue, since the material under conditions of repeated loading will fail under a load smaller than that which will cause failure on one or few applications. The ability of a material to resist fatigue failure is measured by the so-called endurance limit, which is the maximum stress which may be applied indefinitely, under conditions of repeated loadings, without causing failure.

The endurance limit of materials is determined on a testing machine by subjecting the test specimens to reverse loadings from maximum tension to maximum compression. Several specimens are tested to failure under gradually decreasing stresses until the stress is found under which the specimen can withstand an indefinite number of cycles of reversals. In the case of steel, it has been found that a stress which permits 10,000,000 reversals without failure can be safely assumed as the endurance limit.

Plotting Results

The results of endurance-limit tests are plotted, as the so-called S-N curves (stress - number - of - cycles curves) on semilogarithmic paper with axis of ordinates as stresses and axis of abscissa as number of cycles of reversals. Fig. 1 shows an hypothetical S-N curve. The curve becomes horizontal at the stress of 42,000 lb. per sq. in. which means that this stress or any stress below this figure can be applied in 10,000,000, or an indefinite number of, reversals, without causing the break. This stress is therefore the endurance limit for steel represented by the chart.

The endurance limit of a material is decreased by the so-called "stress-raisers." Dents, pits, scratches or holes on the surface of a bar result in concentration of stresses leading to fatigue failure. The mechanism of this failure is generally interpreted as follows: the failure starts usually on the outside, at the base of a pit or dent, that is at the point of stress concentration. A minute crack is formed which results in further stress concentration and further spreading of the crack. This process continues, reducing the working area of the bar until the area is reduced to the point at which the elastic limit of the material is reached and a single application of load results in a failure. The cross-sectional area of a fatigue break is very characteristic. The part of the progressive damage, because of the rubbing of the two parts against each other, is smooth. The part of the final, elastic failure is coarse and granular. Different materials exhibit different resistances to progressive failure. Stress, range of stresses and number of reversals are three main

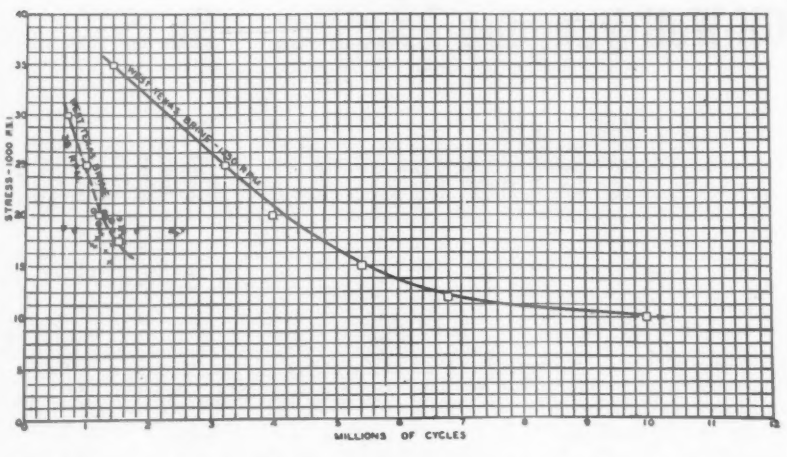


Fig. 2—Correlation between service life in West Texas wells and fatigue tests (from "Laboratory and Field Endurance Values of Sucker-Rod Materials," D. R. Dale and D. O. Johnson, A.P.I. Drilling and Production Practice, 1940)

factors affecting the progress to fatigue failure.

Oil-well sucker rods work under conditions of repeated cyclic loadings, their service therefore is a problem of fatigue. In case of sucker rods, however, there is one additional factor which affects their service and that is the effect of the surrounding medium. The sucker rods often work in highly corrosive fluids. Air-endurance limits of steels cannot be used satisfactorily in designing sucker rods for given working stresses.

Corrosion Fatigue

The effect of corrosion on service of a sucker-rod string may be twofold. Sucker rods working under conditions of light stresses may be eventually destroyed by corrosion, or highly stressed sucker rods may fail because of corrosion fatigue. The corrosion-fatigue failure occurs in two stages. During the first stage, the electrochemical action of the corrosion results in the formation of pits on the outside surface of the rods. These pits cause stress concentration and the second stage of the corrosion-fatigue failure proceeds along the line of the fatigue failure described above. Therefore the resistance of material to corrosion fatigue is determined, primarily, by its resistance to corrosion.

In considering the question of resistance to corrosion fatigue, it should be realized that the time during which a stressed rod is exposed to a corrosive medium is of great importance. If under a given set of corrosive conditions certain rods can withstand 10,000,000 reversals of certain stresses without failure, then the same stress will cause a break at a smaller number of reversals if time of their application is prolonged. Strictly speaking, therefore, there is no endurance limit to corrosion fatigue, and the S-N curve does not become horizontal for the conditions of corrosion fatigue, provided that the cycles of reversals are distributed over a sufficiently long time. The corrosion-fatigue endurance limits arrived at through tests for different types of steels are relative only and should be considered as such. They give only comparative values for different steels under the same set of conditions.

Presence of hydrogen sulfide in the surrounding medium results in further and severe lowering of the endurance limit through the so-called "hydrogen sulfide embrittlement."

As in the case of corrosion, the resistance to hydrogen sulfide embrittlement must be inherent in the metal used. Different alloy steels have been found relatively satisfactory for sulfide condition service.

B. B. Westcott was the first to conduct corrosion-fatigue tests under conditions approximating as nearly as possible the conditions under which sucker rods work in a well. A machine used for these tests[1] was a modified R. R. Moore rotating, beam-type, fatigue testing machine. The modification consisted of enclosing the test specimen in a thin rubber tube attached through stuffing boxes to the bearings of the machine. A system of water reservoirs was arranged which permitted circulating of oilfield waters or synthetic brines through the tube and therefore keeping the test specimen immersed during the test. A pressure of natural gas was maintained throughout the apparatus to exclude air. The corrosion-fatigue limits was assumed as the stress which did not cause failure in 10,000,000 reversals at the frequency of 1,750 applications per minute and at temperatures of 125° F. From the tests originally conducted, Westcott and Bowers arrived at following fatigue limits under different

types of conditions for 1.25 per cent manganese steel:[1]

Conditions of test—	Fatigue limit 1.25% manganese steel (lb./sq. in.)
Non-corrosive (ordinary fatigue limit)	48,900
In oil-well water saturated with natural gas and free from air	19,600
In oil-well water saturated with natural gas and hydrogen sulfide and free from air	14,600

The laboratory tests cannot, for the following reasons, exactly duplicate the conditions under which sucker rods actually operate in oil wells:

1. The test specimens are subjected in testing machines to complete reversal of stresses from maximum tension to maximum compression under conditions of transverse bending. The sucker rods in an oil well are subjected to range of longitudinal stresses from zero stress to maximum tension. Furthermore, in addition to tension stresses, the sucker rods are subjected to bending, wear and impact.

2. To make possible the comparison of different tests, the testing-machine specimens have highly polished surfaces to eliminate the influences of any stress raisers. In actual operations of sucker rods the stress raisers are, of course, present and affect the corrosion-fatigue endurance limit.

3. The time element, already discussed, and its effect on the corrosion-fatigue endurance limit enters into consideration.

4. It is a well-known fact the chemical composition of the fluid produced changes during the life of a well and that therefore the corrosion conditions under which sucker rods are working are not constant.

Despite these differences, carefully conducted and analyzed tests permit classification of different types of steels in order of their suitability to different types of sucker-rod oil-well service.

D. R. Dale and D. O. Johnson presented[2] an interesting correlation of results of laboratory tests on different types of steel with actual performance of these steels under different conditions of field service. Certain simplifications were necessary in order to arrive at comparative field data. The number of reversals to failure was secured by multiplying the number of strokes per day at the average, normal speed, by number of days to failure. This, of course, did not account for shutdowns or possible changes of speed. The stress at the point of failure was calculated by measuring polished-rod load, calculating the load at the pump, and connecting on a chart the two loads, thus obtaining the load gradient. The load at any point was then converted to stress. Such procedure furnished a satisfactory approximation.

Careful analysis was made of corrosive well conditions. Samples of broken rods were inspected for evidence of fatigue cracks. The service of two types of steel in Kansas, Oklahoma City field and West Texas wells was compared with the laboratory S-N curves for these two steels.

Only a fair degree of correlation was obtained between laboratory curves and actual failures. The best correlation is shown in a chart giving comparison between behavior of steel "B" in highly corrosive West Texas wells and slow-speed SN curve. This chart is here reproduced in Fig. 2. It should be noted that none of the actual breaks even approaches the 1,750 r.p.m. curve for the West Texas brine. They are, however, quite closely grouped around the slow-speed curve. This emphasizes the importance of the time element in making the corrosion-fatigue tests.

Bibliography

1. Blaine B. Westcott and C. Norman Bowers, "Corrosion Fatigue and Sucker-Rod Failures," Proceedings Am. Petr. Inst., Production Bulletin 212, 1933, p. 29.

2. D. R. Dale and D. O. Johnson, "Laboratory and Field Endurance Values of Sucker-Rod Materials," Am. Pet. Inst. Drilling and Production Practice, 1940, p. 209.

Crude Desalting

(Continued from Page 226)

are suspended about midway of the vessel's height, and are the treating field. Other salient features are the insulator supports, insulator bushings and step-up transformers receiving current at 330 or 440 volts and raising its voltage to the electrodes to the value indicated above, the capacity of the transformers being rated usually at 5 kva. An automatic switch at the vessel's top shuts off the current in case the liquid level in the vessel drops; thus current can be sent through the electrodes only if the vessel is filled with liquid.

Crude mixed with water and preheated to a predetermined temperature found by experience to be satisfactory is pumped to the unit through the emulsifier, and is distributed between the electrodes by the device. Coalescence of water-and-salt droplets under the electric field goes on and the separated water exits from the vessel. Desalted crude exits at the top ready for processing.

Several methods have been developed for determining the salt content of crudes; the following method has been found satisfactory after long experience.

1. Measure 50 ml. of the oil sample, 50 ml. benzol, 25 ml. acetone and 75 ml. distilled water into a 250-ml. cylinder. The oil volume should be accurately measured, preferably with a pipette which is rinsed with the subsequently added solvents.

2. Heat to 120° F. and emulsify thoroughly by agitating with a piston made of a brass rod to which has been affixed transversely a brass disk whose diameter is slightly less than that of the cylinder. A metal cylinder is advantageous for more expeditious heating. When the time is available, a short soaking period improves the initial extraction.

3. Transfer the contents of the cylinder to two centrifuge tubes, warm to 120° F., and note whether a fairly clear water separation has occurred. If not, add one drop of demulsifying chemical such as Tretolite Compound L-10,396. Any good demulsifier will do, such as have already been suggested by Blair and termed "destabilizers A & B."

4. Centrifuge for 10 minutes at 1,500-1,800 r.p.m., and then siphon or pipette off all of the free water in the tubes through a filter paper into the titrating vessel. Take care that no sludge material is removed from the tube.

5. Add an additional 10 ml. water to each tube, heat to 120° F., shake thoroughly, and again centrifuge.

6. Remove the water completely to the filter previously used, and wash the filter with a little distilled water.

7. The extract obtained may then be analyzed for chlorides or other constituents by standard methods.

TABLE 1—Conversion Factors for Salts in Crude Oils

Mg. per liter*	Grams per bbl.†	Lb./ 1,000 bbl.†	Grains per U.S. gal.	Grains per B.I. gal.	Grams per metric ton‡
1.00	0.159	0.350	0.0584	0.0701	1.176
6.29	1.000	2.200	.3670	.4410	7.400
2.85	.453	1.000	.1670	.2000	3.360
17.10	2.720	6.000	1.0000	1.2000	20.100
14.30	2.270	5.000	.8330	1.0000	16.800
.85	.135	.298	.0497	.0596	1.000

*Approximately the same as "parts per million" (p.p.m.)

†1 bbl. equals 42 U. S. gal.

‡For oils of specific gravity 0.85 (35° A.P.I., 34.7° Be.) at 60° F.

BOOK REVIEW

Bibliographical Survey of Solid Adsorbents. By Victor R. Deitz, Research Associate, National Bureau of Standards. Published by U. S. Cane Sugar Refiners Research Project, J. M. Brown, Chairman, Revere Sugar Refinery, Charlestown, Mass. 900 pp. Price $12.

This survey, covering 6,002 contributions to the scientific literature, was planned to enable one to scan, if not the whole field, at least the material overlapping that of some immediate interest.

There is a complete author index and a large and useful subject index, the latter being designed for cross-indexing utility. A tabulation is given of the abbreviations used for the journal references. A large list of books dealing with the subject of adsorption is appended.

QUESTIONS on TECHNOLOGY

by W. L. Nelson

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Questions should be submitted in as much detail as possible. Inquiries must be signed, but only the given initials will be printed. The source of the question is considered to be confidential. Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.

Suction Conditions for Hot-Oil Pumps

How can I find out how much suction head is required on a pump which handles cracked residuum at a temperature of 750° F. or to handle topped crude at 550° F.?—I. A. A.

A suction pressure or head is required on most pumps to keep the liquid from vaporizing as it is sucked into the pump. The amount of suction that occurs is a function of (1) the speed of the pump and (2) the size and shape of the line or openings through which the fluid enters the pump. Speed should have little effect providing the inlet connections, ports, etc., are adequately large (large enough for the maximum speed that is expected), and the size or shape of the inlet ports seldom has much influence because pump manufacturers design their equipment to avoid such troubles. The maximum suction that can occur without causing vaporization or cavitation appears to be about 8.5 ft. of fluid less than the vapor pressure of the liquid at that temperature. Stated in reverse, this means that a head of 8.5 ft. of fluid plus the vapor pressure of the liquid must be maintained if cavitation is to be avoided. If the liquid is far below its boiling point, a somewhat larger head than 8.5 ft. is required to prevent cavitation. This may be explained by the fact that the tendency of dissolved gases to leave the liquid (Henry's law) is affected more by temperature than the vapor pressure. Pumps differ somewhat in this respect and hence the following tabulation based on data of several pump manufacturers is presented in order to give a more complete picture.

FRICTION LOSS IN PORTS AND SUCTION CONNECTIONS

	At boiling point		At zero vapor pressure	
	Ft. of H_2O	Lb./sq. in.	Ft. of H_2O	Lb./sq.in.
Average self-priming pumps	8.5	3.7	4	1.7
Average rotary and reciprocating pumps	8.5	3.7	10	4.3
Average centrifugal pumps	8.5	3.7	17	7.4

In the temperature range between the boiling point and the low temperature at which the vapor pressure is nearly zero, the constants shown in the tabulation (friction loss) are a linear function of the vapor pressure of the fluid.

The use of these figures is easier than to talk of them and hence the following examples may be helpful:

1. Water pumped at 60° F.—The vapor pressure of water at 60° F. is 0.256 lb. per sq. in., or 0.593 ft. of fluid. The pressure in the suction line can be as low as 0.59 plus 10 (reciprocating pump) or 10.59 ft. of fluid. Stated in another way this means that a suction left of 34 minus 10.59 or 23.41 ft. may be permitted.

2. Water pumped at 200° F.—At this temperature (near boiling point) the vapor pressure is 11.52 lb. per sq. in. (26.6 ft. fluid) and the pressure in the suction line must be 20.6 plus 8.5 or 35.1 ft. of fluid. This means that a head of 35.1 minus 34 or 1.1 ft. must be provided. No lift is possible.

3. Water pumped at 212° F.—The pressure at suction must be 34 (14.7 lb. per sq. in.) plus 8.5 or 43.5 ft. This requires a suction head of 8.5 ft.

4. Water pumped at boiling point.—Same as illustration (3). At each boiling point, whether it be 212° F. or the higher temperatures of boiling caused by high pressure, a head of 8.5 ft., or more exactly, 3.7 lb. per sq. in., must be maintained at the suction connection.

5. 100-octane gasoline at 100° F.—This material has a vapor pressure of 7 at 100° F., and its density is about 0.71 (68 A.P.I.). For a centrifugal pump, the pressure at the suction woud need to be about 7 plus 5.5 (average of 3.7 and 7.4) or 12.5 lb. per sq. in. The maximum allowable suction lift would be 14.7 minus 12.5 or 2.2 lb. per sq. in. This would be about 7.2 ft. of fluid head. Vapor pressures can be obtained from many sources such as the Steam Tables for water, or normal paraffin vapor pressure charts (Petroleum Refinery Engineering, McGraw-Hill Book Co.) for liquid oils.

In answer to the handling of hot materials, a residuum to be pumped from a cracking plant flash chamber at 750° F. would need a head of 3.7 lb. per sq. in. on the pump suction (in addition to the pressure within the flash chamber). The density of such a fluid would be about 0.78 (at 750° F.) and hence the feet of head at the pump suction would be 8.5 divided by 0.78 or about 11 ft. Substantially, the same situation would be required for a 550° F. topped crude oil except that the density would be greater and hence a head of 10 ft. would suffice.

Cooling of boiling liquids.—In addition to the use of liquid head to produce the pressure required to suppress cavitation, liquids at their boiling point may be cooled by an amount that will reduce their vapor pressure by 3.7 lb. per sq. in. (8.5 ft. of water). This is not altogether a fixed amount of cooling because the vapor pressures of different materials change at different rates. Oils which boil at about 200° F. should be cooled by 15°-20° F. and ones that boil at the extreme high temperature of 700° F. should be cooled by 25°-30° F. If pressure is employed the amount of cooling required is much less, being only 1° or 2° F. for water 250 lb. per sq. in., and being only about 5° F. for gasoline boiling at 400° F. (100 lb. per sq. in.).

Charts for suction lift or head.—Charts for specific fluids will be published in a later issue of The Oil and Gas Journal.

PAYOUT OF WELL CLEANOUT JOBS

THE principal objective of cleaning out a well in which sand or cavings accumulate and obstruct the flow of oil into the well bore is to enhance its economic position. Two of the various ways by which the economic position can be enhanced are by obtaining more oil production and eliminating downtime to repair and replace subsurface equipment.

Calculating whether the cleaning out of a particular well is profitable from a standpoint of obtaining more oil production is rather simple although a number of varying answers can be obtained. Cleanout work is essentially a capital investment and hence it is desired to know the length of time of payout.

There are several formulas for calculating payout as follows:

$$\text{Days to payout} = \frac{\text{Cost of cleanout}}{\text{Net bbl. per day increase} \times \text{price}}$$

$$\text{or} = \frac{\text{Cost of cleanout}}{(\text{Net bbl. per day increase} \times \text{price}) - \text{Lifting cost for increase}}$$

$$\text{or} = \frac{\text{Cost of cleanout}}{(\text{Net bbl. per day increase} \times \text{price}) - \text{Extra cost for producing additional oil.}}$$

The cost of the actual cleanout work is highly variable and controversial and this applies to all types and for all purposes. If the work is contracted the price is definite and certain but in many cases company equipment and crews are used for the job. The accounting system may be such that rather high charges for depreciation and maintenance of the pulling unit are included. On the other hand, the method of accounting might show an unusually low charge for the operation of the unit. The actual cost of operation of the unit might be $2.50 per hour and the charge for it $4 per hour; or the reverse could be true.

The variation in the days required to pay out caused by changing the hourly charge can be seen from the following table which is based on doing the work in three 16-hour days with a 3-bbl.-per-day net increase in production and a $1.20 price for the oil. Few wells are cleaned out in only three days although there are some types of treatment that take considerable less time. Each of the formulas in the table gives a different answer.

Also included should be the production lost during the cleanout period which would lengthen the pay out somewhat. The variation in the time to pay out between the lowest and highest number of days is appreciable.

Cleaning out to eliminate downtime due to pulling jobs and subsurface equipment repair cost is equally difficult to clearly analyze and it is just as controversial as the other. For one thing, other means might be used to abate the trouble and the establishment of the economic necessity of cleaning out a particular well might have to give way to some rather simple change in operation.

Factors in Cleanout Costs

Some of the figures affecting the problem come from a common source and hence the divergence due to variation in the charge for the workover machine is not so noticeable as pulling machines are charged on the same basis. Frequently the same machine is used for both jobs; as a result, so many hours of cleanout work would equal so many hours of pulling rods and tubing.

Based on the elimination of downtime, and loss of production only, a trouble-free well for a considerable period must be produced by the cleanout job. A rough estimation is obtained by dividing the time required to cleanout by the downtime per pulling job. If 6 hours is the average downtime for replacement of subsurface equipment and 48 hours is required to cleanout, then eight pulling jobs will have to be eliminated to warrant the reconditioning of the well.

The equipment placed in a well starts operating at maximum efficiency and gradually declines. This becomes important when the lifting equipment is being operated at capacity as a well starting in at 180 bbl. per day after installation of a new pump and declining to 140 bbl. per day in 30 days has failed to produce almost 600 bbl. of oil. It is true that this oil is not permanently lost as a considerable portion of it eventually will be recovered. However, the per-barrel cost of pumping (including labor, depreciation, investment, fuel, engine repair and rod breakage and wear) has risen approximately 22 per cent during the period. Also, at least the interest on the value of the lost, or postponed production should be included in the charges. The earliest at which the unproduced oil could be considered as having been recovered would be when the well's production falls below the capacity of the equipment. This may be a few months or it may even run into years.

Because of the inefficient operation of the subsurface equipment, the production lost and the necessity of pulling the well at regular intervals, a substantial amount must be added to the lifting cost for each barrel of oil produced. If this charge can be cut in half, that is, the time between pulling jobs doubled, then the well can be cleaned out profitably.

On low-capacity wells production is not lost through inefficient subsurface equipment as the pumping period is merely increased to offset the decrease in volumetric efficiency. The increase in cost per barrel lifted also is not as great as no charge can logically be made for labor, investment and depreciation. The 22 per cent increase does apply to fuel, engine maintenance and repair and rod and pump wear and breakage.

Subsurface equipment replacement costs vary widely and may run from a few dollars to $30 or $40 per pulling job, although the latter would be unusual.

The cost of the cleanout job divided by the sum of the average daily costs for pulling jobs, equipment replacement, increase in lifting cost and loss in production will give the days required to pay out. Practically, this determines how often the well can be reconditioned profitably.

	Formula 1		Formula 2		Formula 3	
	$2.50 per hour	$4.00 per hour	$2.50 per hour	$4.00 per hour	$2.50 per hour	$4.00 per hour
Cost of cleanout	$120.00	$192.00	$120.00	$192.00	$120.00	$192.00
Net bbl./day increase	3	3	3	3	3	3
At $1.20 per bbl.	$3.60	$3.60	$3.60	$3.60	$3.60	$3.60
Charge for lifting	$0.00	$0.00	$0.90	$0.90	$0.15	$0.15
Added income	$3.60	$3.60	$2.70	$2.70	$3.45	$3.45
Days to pay out	33.33	53.30	44.44	71.11	34.8	55.65

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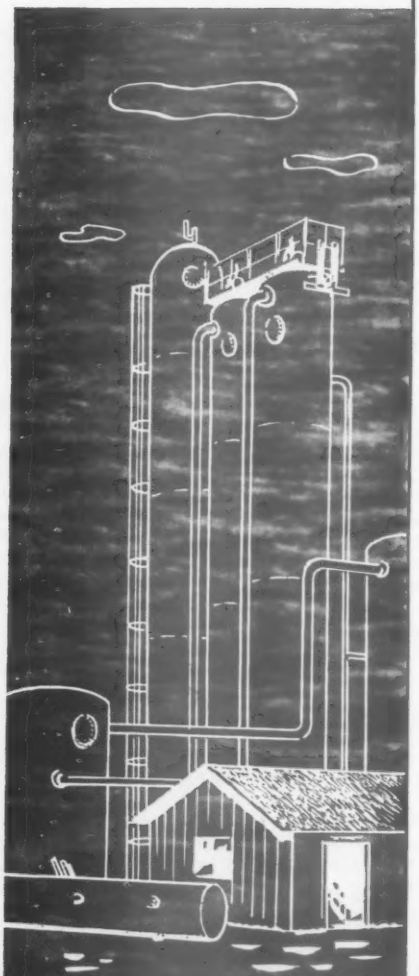

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ADDITIONAL APPLICATIONS OF TEMPERATURE GRADIENTS

Lost Circulation

SOMETIMES, when drilling with rotary tools, certain highly permeable formations are encountered which absorb considerable quantities of the drilling mud. Such a condition often causes difficulty due to the fact that there is an insufficient stream of mud coming back to the surface to carry the drill cuttings out of the hole. As a result the cuttings accumulate at some point in the well bore behind the drill pipe and finally result in a stuck string of drill pipe. Another disadvantage of such a condition is the fact that the lost drilling mud may represent quite a large investment since it may contain considerable quantities of weighting materials, chemicals, or other expensive additives.

Under certain conditions, the formation that is "drinking" a lot of the mud may be some distance off bottom, and thus its location as to depth may be quite a problem. If such is the case, the thieving formation may be located by circulating relatively cold drilling mud in the well for several hours and then making a temperature survey. This condition is illustrated diagrammatically in Fig. 1. The low temperature anomaly obtained between depths a and b indicate the location of the thieving formation, since it contains a relatively large quantity of the cold circulating fluid and would thus not reach equilibrium earth temperature as quickly as adjacent formations which did not absorb the mud.

Source of Water

Under certain conditions it should be possible to get an indication from a temperature survey of the source of water from a sand that is producing water from one level and oil from another. The conditions required to produce the temperature anomaly for such a determination are that the oil being produced contain gas in solution and that the pressure at the sand face be lower than the bubble point pressure, in order to produce a cooling effect opposite the oil-bearing zone. Thus the temperature gradient, taken during or shortly after a period of production, will indicate a rise in temperature at the contact between the oil and water. This condition is illustrated in Fig. 2. Since on many wells it is inadvisable, if not impossible, to produce at high enough rate to reduce the pressure below the bubble point, and since in certain wells insufficient gas expansion occurs to produce an anomaly of the type shown in Fig. 2, this method is rather limited in application. However, it should give valuable supplementary data for planning remedial work to reduce water production on certain wells.

Casing Leaks

A casing leak may cause wastage of valuable oil and gas directly because of passage through the leak into shallow formation. Or a leak may cause indirect waste because of water leaking into the well and damaging the oil and gas-bearing zone or at least increasing the production costs on the well.

One of the important phases of the problem of repairing a casing leak is the determination of its location in the well. A temperature survey will often be valuable in this connection. Water leaking into a well through a hole in the casing may come from a sand either above or below the leak. If the source of the water is above the hole in the pipe, many times the velocity of the flowing water behind the casing between the source and the leak itself will be much greater than the water velocity

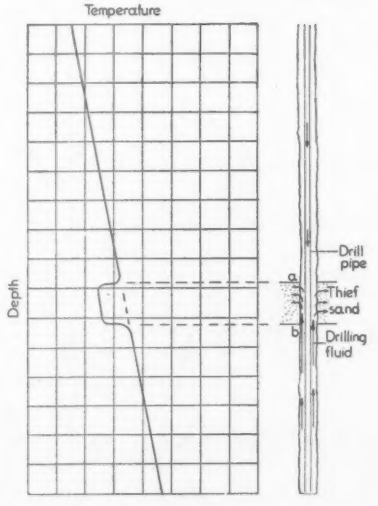

Fig. 1

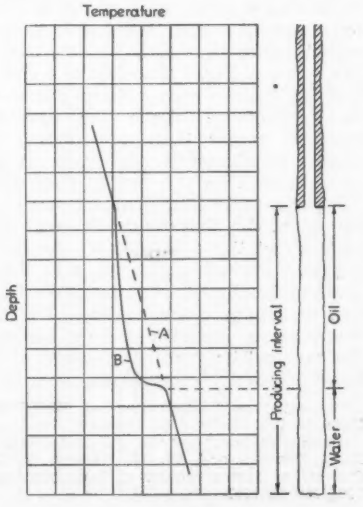

Fig. 2

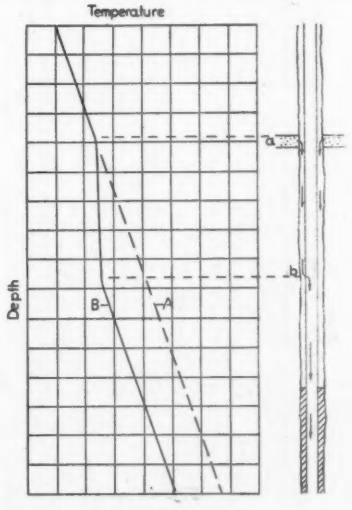

Fig. 3

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

inside the pipe below the leak. If such is the case, a temperature survey should give a result of the type indicated in Fig. 3. The source of the water is the sand at a, while the leak is at depth b. Due to the high velocity of the water between points a and b, little warming of the water occurs, but below b, where the velocity is less, the water is warmed more per unit of depth, but is still at a temperature below that of the normal gradient (Curve A) for the given well.

Leak Above Pay

If the source of the water is below the leak and the water flow is at a sufficient rate to not allow complete cooling of the water as it moves upward behind the casing, a gradient of the type indicated in Fig. 4 would be expected. In Fig. 4, the point a represents the source of the water while point b represents the hole in the casing. It will be noted that the temperature in the hole above point a is above normal due to the warming effect of the water behind the pipe, while the temperature below point a is below normal because of the cooling effect of the water running down inside the pipe.

Gas and oil may be lost from a well through a leak in the casing at some distance above the producing horizon at the bottom of the well. It is possible for such a leak to exist for a long period of time before it is known to exist. Its presence may be suspected because of an abnormally low bottom-hole pressure or from some other circumstantial evidence. A temperature survey will often indicate the presence of such a leak because of the cooling caused by the expansion of gas in passing out through the hole in the pipe. Such a gradient is illustrated by Curve B in Fig. 5 where Curve A indicates the normal gradient for the well. Note that below the leak there may be a slightly higher gradient than normal due to the passage of the warm fluid from the bottom of the hole up to the leak. Such a gradient would best be obtained while the well was not producing at the surface, thus the fluid movement above the leak would be negligible.

If the leak in the casing at the point indicated in Fig. 5 were larger and consisted mostly of oil so that there is little cooling due to expansion of gas, the temperature gradient would be of the type indicated by Curve C of Fig. 5. In this case the temperature anomaly indicating the leak is the abnormally high temperature existing in the lower part of the well.

Leak in Gas Well

The results of some experimental tests on a gas well, made by a group of engineers of the U. S. Bureau of Mines,* indicated that a subterranean leak existed in a gas well and the temperature anomaly from which such an interpretation was made was quite similar to Curve B of Fig. 5. The only essential difference between the actual curve that they obtained and the curve of Fig. 5 was that at a shallow depth there was a sharp increase in temperature above the normal gradient rather than a decrease as shown by Curve B of Fig. 5. It is thought that on this actual well test the abnormally high temperature observed at the shallow depth was due to the fact that the hole in the casing was excessively large, and thus the abnormally high temperature was due to a large accumulation of relatively warm gas at that level behind the casing. The gradient between this point of high temperature and the bottom of the well was somewhat higher than normal for that depth, and was thus similar to the lower part of Curve B, Fig. 5.

Thus, the results reported by the Bureau of Mines did not locate conclusively the actual leak in the pipe, but the temperature anomaly which they obtained possibly indicated only the location of certain shallow, porous formations in which the warmer gas, originally from the lower formation, accumulated. At least it was surmised from a comparison made with an adjacent well that the abnormally high temperature at the shallower depth indicated leakage of gas from the lower depth. Other evidence which substantiated this conclusion was an excessive drop in bottom-hole pressure of the well during a period preceding the temperature survey. The well was repaired by installing a smaller string of casing inside the original string of casing and cementing it. After repairing the well, the pressure in the producing gas sand increased and no other evidence of a casing leak was obtained.

It should be realized that each well is a separate problem and that it would be impossible to cover all possible situations to which temperature surveys are applicable, but the general principles just discussed should be helpful in many operating problems that may arise on individual wells.

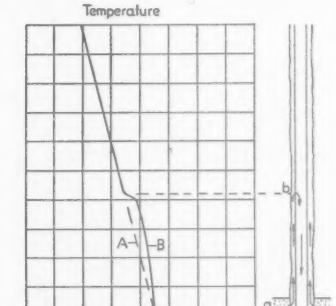

Fig. 4

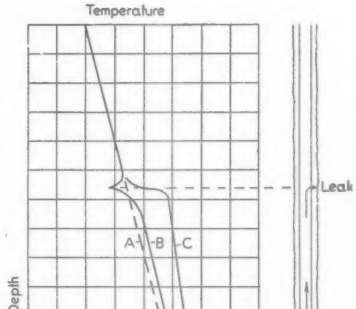

Fig. 5

*Reported as "Application of Well-Test Data to the Study of a Specific Gas-Production Problem," by M. A. Schellhardt, E. J. Dewees, and W. H. Barlow, U. S. Bureau of Mines Report of Investigations 3493, March 1940.

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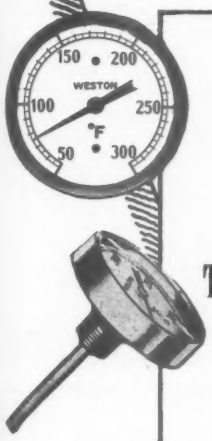

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Natural Gas

Heath Elected President Of California Association

LOS ANGELES, Calif. — At the eighteenth annual meeting of the directors of the California Natural Gasoline Association here last week, R. W. Heath, manager of the gas department of Signal Oil & Gas Co. was elected association president for the 1943-44 term. C. D. Gard of Union Oil Co. was elected vice president.

Mr. Heath was attending Stanford University when World War I started but took a leave of absence in order to enter the armed services. At the conclusion of hostilities he returned to Stanford and finished his academic engineering studies. For a few years he was employed in the engineering department of the city of Palo Alto and joined the Signal Gasoline Co. as a tester in 1923. When Signal Gasoline Co. was consolidated with Signal Oil & Gas Co., he remained with the continuing company and subsequently became superintendent of gas operations and later manager of the gas department, his present position.

Mr. Heath, a native of San Jose, Calif., spent some time in Bristow, Okla., and Big Lake, Tex., in natural-gasoline operations.

In assuming his new office, he called attention to California's natural-gasoline production of more than 1,750,000 gal. per day, including over 200,000 gal. daily of the critical isobutane. As the technical society for this industry, the California Natural Gasoline Association under Mr. Heath's guidance during 1943-44 will continue to conduct studies and research for the improvement of natural-gas and natural-gasoline test methods and procedures.

R. W. HEATH

In addition to electing Messrs. Heath and Gard, the directors also elected five new members to the board. New directors are I. B. Funk, Cowan Oil & Refining Co.; John C. Herron, Shell Oil Co., Inc.; W. L. Rifenberick, Industrial Engineers, Inc.; J. H. Sargent, Kettleman North Dome Association; and J. B. Taylor, Signal Oil & Gas Co.

New Divestment Plan Filed By Standard of New Jersey

PHILADELPHIA, Pa.—The Securities Exchange Commission has been asked to take action by September 15 on an amended plan of Standard Oil Co. (New Jersey) whereby the company will divest itself of its interest in five natural-gas companies. The company asked SEC for an opinion by September 15 in order to consummate distribution of stock before end of the year.

The amended plan was filed by Consolidated Natural Gas Co., a new corporation which would be formed under the proposed divestment. Standard of New Jersey proposes formation of Consolidated Natural Gas Co. for the purpose of exchanging the parent company's stock in the five gas subsidiaries for all stock of Consolidated. The Consolidated shares thus acquired by Standard of New Jersey would be distributed to its stockholders.

The amended plan calls for the acquisition by Consolidated of the stocks of the five natural-gas units at actual cost to Standard of $15,986,017 for Hope Natural Gas Co.; of $20,603,149 for East Ohio Gas Co.; of $7,640,000 for Peoples Natural Gas Co., including a capital distribution of $65,000 to be made this year; of $750,545 including a capital contribution of $125,000 for River Gas Co. and of $1,075,022 for New York State Natural Gas Co.—a total outlay of $46,054,734.

In exchange for the buying of the shares of these companies at the indicated figures, Consolidated would issue to Standard of New Jersey 2,728,359 shares of common stock of a par value of $15 a share. Total par value of Consolidated's stock to be exchanged would be $40,925,385 and the difference, amounting to $5,129,349, would be carried on the books of Consolidated as capital surplus.

The divestment plan was made necessary by an SEC order issued February 8, 1942, which denied the application of Standard of New Jersey for an exemption as a holding company from the Public Utility Holding Company Act.

Texas Panhandle Allowable

Allowable production of 617,240,000 cu. ft. daily of sour gas from the West Panhandle field of Texas for August was authorized by a Railroad Commission order issued last week at Austin, Tex.

Natural Gasoline

Yield of Light Products Shows Moderate Decline

WASHINGTON, D. C.—Production of natural gasoline and allied products in May declined to 235,200 bbl. daily compared with output of 239,000 bbl. in April, the Bureau of Mines reported last week. Production during the first 5 months this year averaged 235,900 bbl. daily compared with 216,700 bbl. per day for the same period in 1942.

Substantial declines occurred in May in the eastern states and in North Louisiana. Arkansas and California reported the most significant increases in production for May, reflecting completion of certain new facilities.

One of the outstanding changes occurring in the manufacture of natural gasoline and related products during the past 12 months is indicated by the substantial increase of approximately 35 per cent in the output of isobutane, and a 46 per cent rise in the yield of other liquefied petroleum gas. Current production of isobutane at natural-gasoline and cycle plants is 9,700 bbl. daily against 7,300 a year ago. Output of other liquefied petroleum gas at natural-gasoline and cycle plants has risen to 54,500 bbl. per day compared with 37,200 bbl. a year ago.

Total demand for natural gasoline and related products in May was 253,100 bbl. daily against 258,333 bbl. in April. Total demand in May, 1942, averaged 214,500 bbl. daily. The increase of approximately 18 per cent in May compared to a year ago is mostly for cycle condensate and liquefied petroleum gas.

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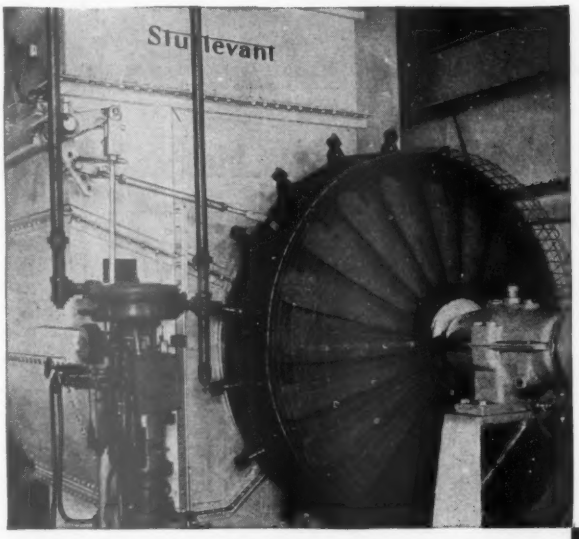

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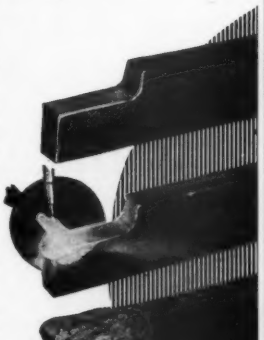

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REFINING

Purchase of Globe Plant Nearly Doubles Capacity of Cooperatively Owned Refineries

PROCESSING capacity of cooperatively owned refineries in the United States last week was increased 15,000 bbl. to a current total of 40,000 bbl. when National Cooperative Refinery Association acquired Globe Oil & Refining Co.'s plant at McPherson, Kans., along with its auxiliary operating facilities. The Globe purchase increases to eight the number of cooperatively owned refineries in the United States, having a combined capacity of approximately 40,000 bbl. of crude daily.

The National Cooperative Refinery Association is a federation of the five wholesales. The national association was incorporated July 7 under the cooperative marketing act of Kansas to own and operate the McPherson refinery. Authorized capital is $2,010,000. Incorporators are Central Cooperative Wholesale, Superior, Wis.; Midland Cooperative Wholesale, Minneapolis; Farmers Union Central Exchange, St. Paul, Minn.; Farmers Union State Exchange, Omaha, Neb., and Consumers Cooperative Association, North Kansas City, Mo.

The Globe purchase was one of the largest cash transactions in the history of the cooperative movement in the United States, requiring a capital outlay of close to $5,000,000 when working capital and the value of the inventory are included. The new owners will begin operating the plant about August 1.

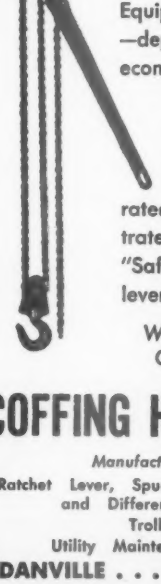
The McPherson refinery has a rated capacity of 15,000 bbl. daily and an extreme capacity of 17,500 bbl. Included in the purchase is the 229-mile, 6-in. refined-products pipe line extending from McPherson to Council Bluffs, Iowa, an oil-compounding plant, together with land, buildings, storage tanks and other equipment. The products line, completed in 1941, can deliver as much as 9,000 bbl. of gasoline a day. Storage facilities for 220,000 bbl. of crude oil and 600,000 bbl. of refined products at McPherson were included in the acquisition. The Council Bluffs terminal is equipped to store 300,000 bbl. of refined products.

The five regional cooperate wholesales that incorporated NCRA previously owned four refineries. Consumers Cooperative Association owned two plants, one at Phillipsburg, Kans., the other at Scottsbluff, Neb. Farmers Union Central Exchange owns a plant at Laurel, Mont., and Midland Cooperative Wholesale operates a plant at Cushing, Okla., which was acquired earlier this year. A discussion of the cooperative refining movement was published in the April 29 issue of the Journal.

The five cooperative wholesales distribute farm and home supplies through 1,402 local associations which serve 725,000 patrons. Their combined volume of business at wholesale last year totaled nearly $45,000,000.

Howard A. Cowden, president and general manager of Consumers Cooperative Association, also is president of NCRA; W. R. Graham, in

BEHIND THE GUN



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charge of the oil department of Midland Cooperative Wholesale, is vice president of the new corporation, and J. L. Nolan, head of the petroleum department of Farmers Union Central Exchange, is secretary-treasurer.

General manager of NCRA's McPherson refinery is A. E. Landsittel who has been general sales manager for Globe during the past 20 years. Globe Oil & Refining Co., headed by I. A. O'Shaughnessy of St. Paul, will concentrate its future operations at the 27,000-bbl. refinery at Lemont, Ill.

River Petroleum to Expand Belle Chase, La., Plant

Increase of capacity of the specialties refinery of River Petroleum Corp. at Belle Chase, La., 9 miles below New Orleans, and revamping of some of the units is under way. Work is under the direction of Harold F. Bottomley, new chief engineer who has been on the job about a month. F. R. Redfern is general manager of the company, also on his new job about a month. F. M. O'Connor is president of the company.

Mr. Bottomley was formerly chief engineer of Cosden Petroleum Corp. of Big Spring, Tex. He is well known in the industry for his work in refining West Texas and other high-sulfur, "sour" crudes. The chief chemist is Arnold A. Bondi, who specializes in sulfonates, naphthenic acids and other specialty petroleum-hydrocarbon products.

This refinery when revamped and expanded will produce conventional lubricants from coastal type oils, aviation lubricants, sulfonates, naphthenic acids, asphalts and similar products, President O'Connor stated. The plant is located on the Mississippi River, with terminal facilities for loading tankers, barges, tank cars, and will supply products to terminals in the Mississippi Valley, the Gulf Coast and the Caribbean and West Indies islands. Currently, only the lubricating-oil plant is operating, at approximately half capacity, re-refining aviation lubricating oils by flashing and contact-clay filtration.

Petroleum Refining Catalysts Freed by OPA

WASHINGTON, D. C.—All catalysts sold for use in the manufacture of synthetic rubber, aviation gasoline and toluene from petroleum are exempt from price control, the Office of Price Administration announced last week.

The exemption includes the entire class of catalysts and expands previous OPA actions in which certain types of catalysts were withdrawn from price control.

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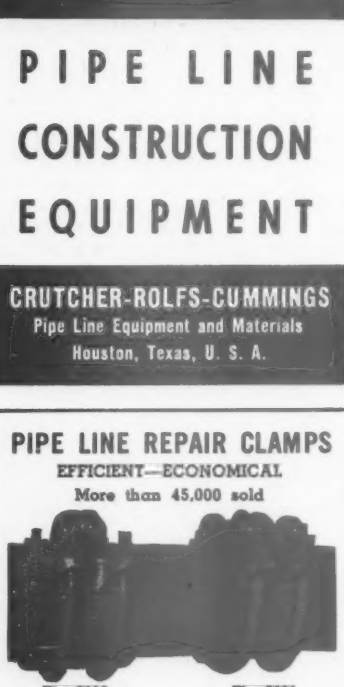

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PIPE LINES

Cities Service Prepares for Hugoton-Blackwell Line

Cities Service Transportation & Chemical Co. has received bids for the construction of the 240-mile 26-in. natural-gas pipe line to be built from the Hugoton field to Blackwell, Okla., and it is expected that contracts will be let soon.

Hudson Engineering Corp. has been awarded a contract for the design and construction of the compressor station to be located at the western end of the line. Along the route of the line, right-of-way is being acquired by 18 buyers who are now in the field. Already the company has more than two-thirds of the right-of-way.

Cities Service Called by FPC to Clear Hugoton Line

WASHINGTON, D. C.—Three corporations, Cities Service Co., Cities Service Gas Co. and Cities Service Transportation & Chemical Co., principals in negotiations for building a 26-in. natural-gas line from the Hugoton field to Blackwell, Okla., last week were ordered to appear August 11 before the Federal Power Commission at Kansas City, Mo. The FPC said it would investigate whether the companies "have violated or are about to violate" the natural-gas act and would determine simultaneously if they should be granted a permit of convenience and necessity.

The FPC announcement said that the three companies had refused requests to file application for a permit. The commission said that the alleged refusal was at variance with the companies' representations to the War Production Board.

Priorities for materials with which to construct the 240-mile line were approved by WPB May 24 on condition that the companies obtain necessary permits for the project.

Meanwhile, the commission said, complaints have been filed with it by the Corporation Commission of Kansas and the Union Gas System, Inc., a Cities Service customer, against the proposed location of the pipe line.

Both complaints, the FPC said, expressed concern that the location would not serve as well as other locations to assure an adequate supply of gas this winter.

The Union Gas System, the FPC added, charged that the companies were deliberately planning the location so as to bring about an "unnecessary shortage" of gas, "thus permitting them to cancel their lower-price contracts and to secure for themselves a complete monopoly of gas distribution in this area."

PAW Approves Second Station on Stanolind Line

A second station will be built by Stanolind Pipe Line Co. on the 16-in. line planned from West Texas to Drumright, Okla., now that PAW has recently approved an amendment to the original application for the project.

The station, containing two electric centrifugal units will be located 2 miles from the siding, known as Bretch which is south of Hobart, Okla. As result of this installation, the capacity of 16-in. line will be stepped up to 65,000 bbl.

Laying of pipe for the 16-in. line is not expected to start before November.. Meanwhile, some advance work may be done at river crossings.

Hearing Is Set August 8 On Hope Gas-Line Project

WASHINGTON, D. C.—Application of the Hope Natural Gas Co., Clarksburg, W. Va., for authorization to build a 1,140-mile 22-in. gas line from the Hugoton field in southwestern Kansas to Kanawha County, West Virginia, has been set for hearing before the Federal Power Commission here August 18.

The company proposes to install nine compressor stations, having an initial capacity of 68,000 hp. According to the application, the proposed facilities will be capable of delivering at the eastern end 180,000,000 cu. ft. per day. At 100 per cent load factor, the new line would bring into the Appalachian area 65,700,000,000 cu. ft. of gas per year and at 90 per cent load factor, 59,130,000,000 cu. ft. Through the installation of additional compressor stations, the application points out, the proposed facilities will be capable of delivering at the eastern

end 240,000,000 cu. ft. per day. At 100 per cent load factor, this would bring into the Appalachian area 87,600,000,000 cu. ft. of gas per year, and at 90 per cent load factor the amount would be 78,840,000,000 cu. ft.

Stanolind Adds Pumping Units to Texas Stations

Between Mexia, Tex., and the Red River, Stanolind Pipe Line Co. is installing a pumping unit driven by a 450 hp. diesel engine at each of the following stations: Lakenon, Cresson, Graford and Bowie. This represents the final step to complete the program which began several months ago with the laying of loops. Currently, the Mexia-Healdton line is pumping about 40,000 bbl. On completion of the new units pressure will be raised from about 700 to around 1,000 lb. and capacity will be increased to 50,000 bbl. daily. Total deliveries of all Stanolind lines from Texas to Oklahoma have been raised from 46,000 bbl. daily of a year ago to 76,000 bbl. daily now.

Engines for the Graford, Lakenon and Bowie stations were procured from a power plant at El Paso. Their power output may be increased in the future by the installation of a supercharger. The engine for the Cresson station came from a Clovis, N. M., power plant and plans have been definitely made for equipping it with a supercharger.

Units being added to the Cresson, Graford and Bowie stations will be equipped with conventional reciprocating pumps. The unit being installed at the Lakenon station will have a pump of a type which will be distinctly different from anything previously used on pipe lines. It is a vertical pump with cylinders on top and crankshaft below. This pump is direct-connected with the diesel engine without use of differential gears. This is said to be an answer to the demands made for a number of years for equipment which would eliminate the power loss in transmission through gears. It is reported that the pump resembles a diesel engine and that the unit has the appearance of one diesel engine connected with another. Preparations are being made for installing the engine but delivery of the pump at Lakenon is not expected until late in the fall.

New Appointments for O.P.L. and Ajax Lines

Several changes have been made in the positions of men supervising operations of Oklahoma Pipe Line Co. and Ajax Pipe Line Corp.

Stanley L. Westlake becomes chief engineer of both companies and is located at Tulsa. He exchanges positions with O. C. Nonweiler who becomes superintendent of Ajax with headquarters at Springfield, Mo.

Francis Coryell has been transferred from the position of master mechanic of the pipe-line system of Standard Oil Co. of Louisiana to become general superintendent of Oklahoma Pipe Line Co. with headquarters in Tulsa.

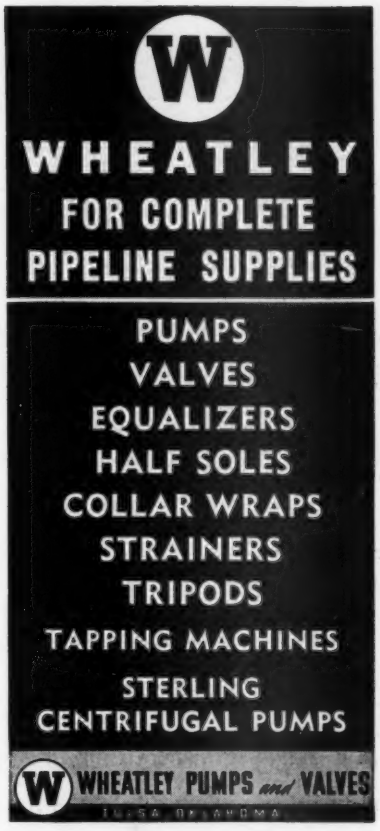
PIPE-LINE PERSONALITIES

D W. SIMS, recently appointed assistant manager of Continental Oil Co.'s pipe-line department, was born at Eldorado, Okla. He attended grade and high schools at Roosevelt, Okla., and was graduated from Oklahoma A. & M. College, Stillwater.

From 1928 to 1930 he was employed in a furniture store at Stillwater, leaving that position to join Continental Oil Co. as a clerk in the pipe-line accounting division. He was transferred to the telephone and telegraph division in July 1930, and in 1932 was appointed superintendent of that division.

On May 1, 1943, he was promoted to be assistant manager of the pipe-line department.

Continental Oil Co.'s pipe-line department operates more than 1,700 miles of crude-oil lines, ranging from 2-in. to 10-in. The system is more than 75 per cent composed of 4-in. and larger diameter pipe. The pipeline system is equipped with 57 pumping station.



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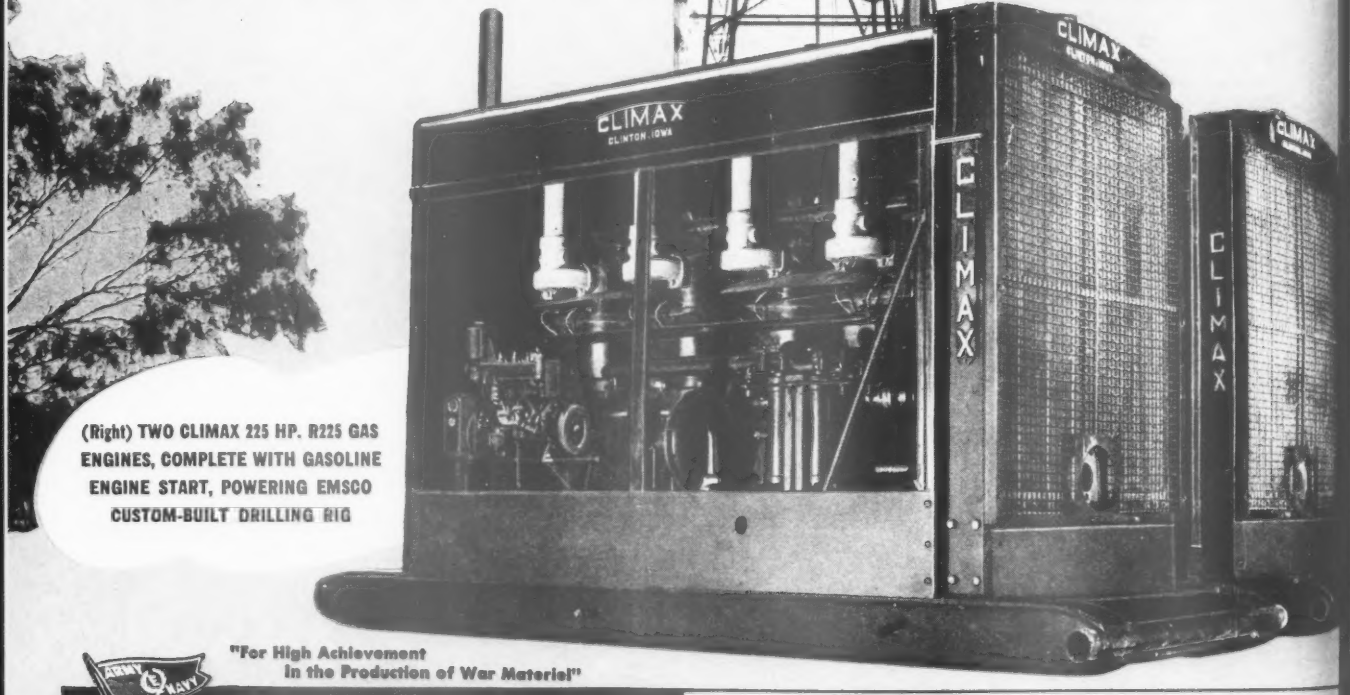

(Right) TWO CLIMAX 225 HP. R225 GAS ENGINES, COMPLETE WITH GASOLINE ENGINE START, POWERING EMSCO CUSTOM-BUILT DRILLING RIG

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Exploration and Drilling

Week's Highlights

IF the collapse of the Fascist regime in Italy is followed by the surrender of that country and its occupation by Allied forces, it is interesting to speculate on the effect of these changes on the oil industry. That there will be more demand for oil is practically a certainty. With Italian airports in Allied hands, the intensity of air raids on Germany will increase and instead of relatively short flights, the planes will have long trips over the Alps. Instead of having almost complete mastery over the air, strong fighter escorts will probably be needed and these will require more fuel.

It also appears likely that the ground forces will also require much more fuel, not only for the long trip through Italy to positions in the north, but for a stepping up of fighting on a larger scale, including action in the Balkans which will also require more fuel.

Italian railroads have been dependent on coal from Germany and France and this will naturally be cut off, making the Allied invasion army still more dependent on petroleum products. Occupational forces will also require extensive use of motorized transport.

Balanced against these large increases in demand, is an infinitesimal supply in Italy proper of about 200 bbl. daily and another 1,500 bbl. from Albania, if this area also falls into Allied hands.

On the other hand, the Axis oil position will be temporarily strengthened as Germany will be freed from the necessity of supplying Italy and will, at the same time, have shortened its lines of communication.

Greatly offsetting these developments will be the increased vulnerability of German oil supplies. Probably 80 per cent of the crude oil available to Germany comes from Rumania and the newly developed fields in Hungary and the Vienna basin. At the same time, clearing the Mediterranean of Axis vessels, as seems inevitable, will greatly increase the amount of oil available to the Allies from the Near East. Egyptian production has been on the upgrade for several years, the enormous supplies of Iran and Iraq have been produced far below capacity and Bahrein, Kuwait and Saudi Arabia are also capable of very considerable increases in production. Large refineries in the Near East had a prewar capacity of some 400,000 bbl. daily which is about two-thirds of the estimated requirements of the German Army on a blitzkreig and more than three times its normal daily requirements. Italian refineries which may be put in working order also had a prewar throughput of nearly 60,000 bbl.

It is possible, therefore, that events of the past week in Italy will lead to some loosening of supplies in the United States.

This possibility is nullified to some extent by the fact that supplies in the United States are dwindling, except in districts remote from the eastern markets. Longer hauls of crude will be required and it is quite possible that under war conditions, civilian consumption would not benefit by a decline in military demand. It is also possible that military demand will increase rather than lessen, at least for a while.

WEST TEXAS: Ellenburger production is extended 1 mile north in the Barnhart pool of southeast Reagan County (p. 259).

NORTH TEXAS: Two new Strawn sand fields are opened in Wichita County. One well, 2 miles south of Wichita Falls, flowed over the derrick. The other is a pumping well and is 1½ miles west of Wichita Falls (p. 254).

COMPLETIONS IN ALL FIELDS . . .

(Week ended July 24, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna. W. Va.	53	15	3	71	130,096	1,775	1,959
Ohio	6	9	8	23	66,658	442	580
Indiana	0	0	1	1	2,741	123	183
Kentucky	2	0	5	7	15,990	191	122
Illinois	25	0	25	50	129,599	915	906
Michigan	10	2	11	23	53,254	276	386
Kansas	27	2	20	49	168,261	845	836
Nebraska	0	0	1	1	3,471	17	23
Missouri-Iowa	0	0	1	1	1,403	8	9
Oklahoma	13	1	15	29	108,507	603	715
Texas:							
North Central Texas	10	0	19	29	73,561	685	655
West Texas	13	0	3	16	59,671	444	882
Texas Panhandle	3	0	0	3	8,630	94	224
Eastern Texas	7	0	3	10	55,517	148	226
Texas Gulf Coast	6	0	7	13	88,467	229	437
Southwest Texas	10	1	10	21	109,084	474	690
Total Texas	49	1	42	92	394,930	2,074	3,114
North Louisiana	5	0	3	8	23,238	165	262
Louisiana Gulf Coast	3	0	5	8	68,179	189	296
Total Louisiana	8	0	8	16	91,417	354	558
Arkansas	2	0	7	9	37,917	134	84
Mississippi and Southeast	2	0	0	2	9,645	50	30
Montana	4	0	0	4	6,109	107	88
Wyoming	4	1	1	6	30,501	64	53
Colorado, Utah	0	0	0	0	0	6	9
New Mexico	4	0	0	4	14,991	114	136
California	23	1	3	27	99,983	666	429
Total United States	232	32	151	415	1,365,473	8,764	10,220
Total previous week	196	27	112	335			
Week ended July 25, 1942	184	41	117	342			

Geophysical Exploration At Peak

GEOPHYSICAL exploration has been conducted for over a year at peak levels, although the number of discoveries has not increased and the average size of these discoveries has decreased. In January 1942, the number of seismograph units in the field passed the 200 mark, rising rapidly to over 225 and on April 1 of this year, it stood at 237. At the same time, there were 58 gravimeter crews in the field. Magnetometric and electrical surveys are also being conducted but no information is available as to the number of surveys being made.

The increase in geophysical work has been accompanied by severe manpower shortages and shifts. According to William B. Heroy, director of reserves, PAW, companies engaged in geophysical operations had 4,395 employes on January 1, 1942, employed 2,959 during the year but lost 3,269 to the armed services or government organizations, ending up with 4,085 employes. At the same time the number of prospective trained candidates for positions now enrolled in the colleges has greatly declined. The result is that at a time when there is more need than ever for exploration, the facilities available are overworked and there is a lack of trained recruits.

That the number of discoveries is not greater, in spite of the increased geophysical work is not a reflection on the quality of the work being done or on the degree of training of much of the existing personnel. It is obvious that with the finding of a geophysical prospect, the number available has been reduced by one. With exploration continuing on an increasing scale since 1925, the location of a new structure becomes increasingly difficult.

Changes in Methods

There have been some changes in geophysical methods during the past two decades but these have been in the direction of greater efficiency rather than in the development of new methods. For example, the reflection seismograph has largely replaced the refraction seismograph, although the latter instrument is still used successfully in some areas.

In measuring the density of rocks, the gravimeter has been found to be more easily operated than the torsion balance although the one has not been entirely replaced by the other.

Each method has been found to be successful somewhere but none has been universally successful. The reason for this lies in the local geology and in the difficulty which it places in the way of interpretations of the results obtained.

Improvements and progress in the use of geophysical exploration depend on two main factors, closer collaboration between geologists and geophysicists and the improvement of geophysical instruments themselves.

With structures becoming continually more difficult to find and with a growing emphasis on stratigraphic traps which are, at best, hard to locate by either geophysics, geology or a combination of both, these improvements are becoming increasingly necessary.

The war is seriously hampering both programs as fewer geologists and geophysicists are available and much of the research conducted by geophysical companies is for the use of the Army and Navy and is not immediately available for oil-finding purposes.

Properties Used

There are four properties of rocks which are measured by geophysical methods at the surface, their elasticity, weight, magnetism and conductivity. Of these, the conductivity of rocks and their fluids varies between wide limits and thus offers greatest difficulty to surface exploration. This variation, however, makes electrical logging methods feasible. In logging, another property of rocks can be measured which is not available for surface exploration, namely their radioactivity or the effects obtained by bombarding them with radioactivity emanations.

Since the basic principles of geophysical exploration are well established, it follows that no revolutionary new oil-finding method can be expected to develop. Geophysical exploration began as a result of work conducted during World War I and many expect that World War II will be followed by equally radical changes in exploration methods. It is much more likely that all that will come out of the research now being conducted will be instrumental refinements giving more selective or more accurate readings and increased efficiency resulting in greater economy in geophysical exploration.

One line of endeavor is certain to be followed with increasing zeal and that is the collaboration between the geophysicists and geologists in interpreting the results of geophysical surveys. Geophysics is demanding of geologists a more detailed knowledge of their science than they now possess.

The declining discovery rate is resulting in a greater demand for geophysical and geological exploration, both in reconnaissance and in detailed surveys. Much of the area now open for prospecting lies in glaciated regions where surface exposures are rare and geophysics offers the only method of surface exploration.

Magnetic and Gravimetric Maps of Missouri

ROLLA, Mo.—The Missouri Geological Survey has just issued two interesting maps of the state showing magnetic and gravimetric anomalies, respectively.

The magnetic map shows anomalies on a 100-gamma interval, from observations made at 1-mile intervals (usually section corners), except in the central Ozark region where the observations were made along the principal highways. Every portion of the state shows striking anomalies. The area of pre-Cambrian outcrop stands out as the area of the most pronounced differences in magnetic attraction. The anomaly at Bourbon, in Crawford County, which has a maximum of 6,500 gammas, is the most pronounced anomaly in the state where the pre-Cambrian formations are covered with a considerable thickness of sediments. The Malden anomaly, in New Madrid County, shows a strikingly polarized area extending approximately 8 miles east and west by 4 miles north and south. Both this area and the Bourbon high are reproduced on an enlarged scale on the border of the map.

The gravimetric map was prepared from observations made at approximately 5-mile intervals along the principal highways of the state. The gravimetric anomalies are contoured on 100 gravitational unit intervals. In many areas there is concordance of the gravimetric and magnetic anomalies. This is well illustrated in the Malden, Hunterville and Bourbon area. One of the most striking anomalies is the differences that are found in the Joplin area, although no relation to the ore deposits is apparent.

These two maps are on the same scale as the state geological map (1 : 500,000) and can be obtained at a cost of 50 cents each by addressing the Missouri Geological Survey, Rolla, Mo.

Pressure Drop and Water Disposal Problems of Arkansas Fields

The Arkansas Oil and Gas Commission recently appointed committees to study pressure maintenance and salt-water disposal in the Magnolia and other fields. The results of some of these studies are presented in this slightly abridged report.

AT the present time (May 1943) the Magnolia field is producing at the surface 16,941 bbl. of oil, 3,600 bbl. of water, and 18,557,000 cu. ft. of gas per day. This amounts to a total gas, oil and water daily reservoir voidage of 33,750 bbl.; 72.45 per cent of this is oil plus solution gas; 16.9 per cent is free gas; and 10.65 per cent is salt water.

The commission's estimate of the original oil reserves is 180,000,000 bbl. The total oil recovery as of June 15, 1943, was 27,550,000 bbl.

The original reservoir pressure as of March 1938 was 3,465 lb. and as of June 15, 1943, was 3,016 lb. The average daily reservoir pressure decline from June 4, 1942, to June 15, 1943, has been 0.2 lb. per day. This is a decline in reservoir pressure of 10.8 lb. per million barrels of oil produced.

Pressure maintenance by fluid injection.—The committee has made a geological study of the reservoir and prepared cross-sections for the purpose of selecting the optimum locations for injection wells. In this connection a study of all abandoned wells was made for consideration as injection wells. A test injection location is being considered and the cost of the experiment estimated. These will be submitted to the operators for their consideration and approval. In the event it is found impossible to dispose of salt-water production by injection and pressure maintenance of the producing reservoir, it is planned to test shallower sands for salt-water disposal.

Reworking wells producing salt water.—Fifteen rework attempts have been made in the Magnolia field, of which 4 were complete failures, 10 were partially or temporarily successful, and 1 is successful to date, 9 months after reworking However, included in the temporarily successful reworks are several which remained free of water up to a period of 9 months. It seems that any attempts to rework edge wells now making water would be at best only temporarily or partially successful. Therefore, it is doubtful that the present volume of salt-water production could be materially reduced by reworking.

Reworking high gas-oil ratio wells. There is not sufficient information at present to determine whether reworking will prove successful in reducing the high gas-oil ratio wells.

Transfer of allowables.— Transfering the allowable of wells making salt water to other clean oil wells on the same lease and royalty ownership would reduce the total present salt-water withdrawals only 11 bbl. per day. The reason for such a small reduction is because of the diversified lease and royalty ownership interests which would greatly prohibit such transfers. Therefore, the benefits from this method of transfer would be negligible at this time. Transferring oil allowables from wells producing salt water to other clean oil wells, regardless of lease and royalty ownership interest would completely eliminate the salt-water production which is now 3,600 bbl. daily.

Transferring of allowables from wells producing with a gas-oil ratio in excess of 2,000 cu. ft. of gas per barrel of oil produced to wells with lower ratio to the same lease and royalty ownership interest would save 64,000 cu. ft. of gas daily at atmospheric conditions. This volume of gas is equivalent to 70 bbl. of reservoir space. Transferring of oil allowables from wells with gas-oil ratios over 2,000 to wells producing with an average gas-oil ratio of 1,000 cu. ft. per barrel of oil produced regardless of ownership would result in a saving of 1,900,000 cu. ft. of gas per day at atmospheric conditions. This would be equivalent to 2,101 bbl. of reservoir space.

Pro rata system of net volumetric reservoir withdrawals per well.—Each well is now allowed to produce its base daily allowable accompanied by 2,000 cu. ft. of gas per barrel of base oil allowable without penalty. For a 40-acre unit with a base oil allowable of 157 bbl. per day and producing with a gas-oil ratio of 2,000 cu. ft. per barrel and no salt-water production, the daily reservoir voidage is 442 bbl. Arbitrarily assuming that 442 bbl. would be the maximum volume of reservoir space that could be voided per day per 40 acres, calculations show that the net reduction in daily reservoir voidage would be 1,530 bbl.

Assuming that the wells now producing salt water which would have their present production curtailed by this volumetric formula and continued to produce the same percentage of salt water at a reduced rate of withdrawals, this 1,530 bbl. of reservoir space would amount to an approximate reduction of 255 bbl. of stock tank oil and 1,255 bbl. of salt water per day.

Reduction in oil allowable.— It is

DAILY AVERAGE PRODUCTION FOR WEEK

	July 24 crude oil	July PAW quota all oils	July 17 crude oil
Arkansas	77,400	77,200	77,200
California	770,350	827,000	780,150
Colorado	6,195	7,000	6,050
Eastern fields	99,200	113,100	96,975
Illinois	212,000	233,000	219,800
Indiana	12,400	14,500	13,750
Kansas	306,150	300,000	293,700
Louisiana	349,300	331,300	349,250
North Louisiana	*85,300*	.....	*85,250*
Louisiana Gulf Coast	*264,000*	.....	*264,000*
Michigan	55,800	60,100	55,880
Mississippi	50,500	50,000	50,850
Montana	21,420	21,800	21,555
Nebraska	2,150	2,200	2,100
New Mexico	103,900	105,700	100,200
Oklahoma	332,950	361,400	330,650
Texas	1,615,600	1,727,000	1,615,600
East Texas	*371,000*	.....	*371,000*
West Texas	*245,600*	.....	*245,600*
North Central Texas	*137,700*	.....	*137,700*
East Central Texas	*128,000*	.....	*128,000*
Texas Panhandle	*90,400*	.....	*90,400*
Texas Gulf Coast	*559,900*	.....	*559,900*
Southwest Texas	*83,000*	.....	*83,000*
Wyoming	101,255	97,200	97,605
Total United States	4,116,570	4,328,500	4,111,315
Total production Jan. 1-July 24, 1923			807,576,475 bbl.
Same period last year			773,935,840 bbl.

generally accepted that there is a direct relationship between the rate of withdrawals and reservoir pressure behavior. By using a method to calculate volumes of water encroachment and reservoir pressures at future dates, as proposed by the Bureau of Mines in their Petroleum Engineering Report of Magnolia oil field, now in press, it is estimated that present daily withdrawals are in excess approximately 3,500 reservoir bbl. in order to materially arrest bottom-hole pressure decline.

Schuler Field

Disposal of salt-water production in the Schuler field has been a problem for the operators for quite some time. A number of squeeze jobs have been attempted. Only one out of four workovers in the Reynolds lime was successful in eliminating salt-water production. In the Jones sand, of the 16 wells squeezed or plugged off at the lower perforations only 3 were successful and 6 wells showed temporary and partial successful workover.

Since February 1943 Marine Oil Co. 5 Justiss, a dry hole, has been used as a salt-water disposal well. Unsuccessful attempts to dispose of salt water in this well were made in the James lime, Buckrange and Meekin sands and the Salt and Pepper sand. Finally when the Wilcox sand was tested from 1,020-1,245 ft. it was found that this sand had a maximum injection capacity of approximately 3,300 bbl. per day. At the present time, however, the input capacity is down approximately to 2,650 bbl. per day with a pump pressure of 60 lb. Up to June 1, 1943, this system has injected 273,000 bbl. of salt water into the well.

Since the present disposal well does not have sufficient capacity to dispose of all of the water produced, Phillips Petroleum Co., the operator of this project, has recommended drilling an additional Wilcox well for disposal purposes.

Village Field

The daily salt-water production in this field is approximately 500 bbl. Disposal up to date has been by salt-water pits, but this has been troublesome due to occasional leakage and weakening of the dikes. From a standpoint of the reservoir pressure, the drop has been only 0.09 lb. per day since discovery. For this reason salt-water disposal in this field becomes important primarily from the standpoint of eliminating fresh water stream and terrain pollution.

The Carter Oil Co. has attempted to dispose of the salt water by injecting it into the Tokio formation which lies above the producing horizon. This experiment proved a failure due to the high pump pressure necessary for injection.

This same operator now has derrick built and is preparing to move in tools on the same well for the purpose of determining if salt-water injection into the Smackover lime is feasible. The results of this experiment should be available during the latter part of August 1943, and will serve as an excellent guide as to the possibilities of salt-water disposal in other Smackover lime pools.

Midway Field

The operators in this field pursuant to authorization granted by this commission, began the injection of water into this field April 19, 1943. Results have been more beneficial even than was expected. Application was made to the PAW for use of the material necessary to build a pressure maintenance and salt water-disposal system to serve the entire field. This application has been approved. A contract has been drawn and will immediately be handed to all of the operators in the field for approval and signature. When approval and signature is obtained application will be made to the commission for permission to carry forward the program.

At an input rate which has been purposely limited to an average maximum of 2,500 bbl. per day, approximately 200,000 bbl. of water has been injected. Input pressure is proportional to rate of input. For instance, at 2,500 bbl. per day it is about 700 lb. This pressure can be reduced by lowering input rate or by additional acid treatment of the well or by both. Volumetric withdrawals from individual areas within the pool have been permitted to remain unchanged since November 1942; hence, any change observed in bottom-hole pressure trends can be rightly attributed to its injection experiment.

The average reservoir pressure measured at wells in the major portion of the field was declining an average rate of 0.56 lb. per day prior to injection. Measurements on July 11, 12 and 13, 1943, show that the decline is arrested and that wells located over 3,000 ft. from the input well are showing results. For example, bottom-hole pressure on 1 Powell, north offset, on April 29 was 2,663 lb. On July 12 it was 2,698 lb. On 2 Powell, northwest diagonal offset, pressure increased in the same period from 2,642 lb. to 2,695 lb.; on 1 Creek, northeast diagonal offset, increased in the same period from 2,660 to 2,674 lb. and on 1 Dobson, about 2,900 ft. north and east of the input well, the pressure increased during the same period from 2,642 to 2,673 lb.

The success of the operation seems assured. Not only will pressures be increased, but a greater ultimate recovery will result both from an efficient and economical standpoint and at the same time a satisfactory method for disposal of salt water is being demonstrated.

OKLAHOMA

Pottawatomie Wildcat May Extend Wilcox Area

A NUMBER of wildcats were under way last week but there were no pool-openers reported. Atlantic Refining Co. was getting ready to test its wildcat on the southwest edge of the city of Shawnee in Pottawatomie County after drilling to 5,510 ft. in the second Wilcox, which showed water. It was plugged back and casing perforated at 5,343-48 ft. in dolomite. Previously, a drill-stem test at that depth recovered 40 ft. of oil and 80 ft. of oily mud. Location is in the NE NE SW 24-10n-3e, northeast of Tecumseh Lake and north of Charles Balph's 1 Pool, which was finally completed last week for 100 bbl. of oil and 300 bbl. of water in Wilcox sand at 5,227-30 ft.

Okfuskee County.—Two wildcats were reported as ready for plugging. J. Garfield Buell et al 1 Schultz, SE SE NW 13-10n-8e, between the Cromwell and Olympic pools, had no shows after finding the Booch at 3,134 ft., Gilcrease at 3,390 ft. and Cromwell sand at 3,585-3,650 ft., total depth. The other well was Amerada Petroleum Co. 1 Kennedy, SE NE NW 27-12n-10e, which had water at 3,830 ft.

Caddo County.—A large Medrano sand well was added to the newly discovered deep pay area at the southwestern edge of the Cement pool. Phillips Petroleum Co. 1 Hartshorne, NW NE NE 2-5n-10w, flowed 944 bbl. of oil through 1-in. choke in 20 hours at 5,620-5,745 ft.

WILDCAT COMPLETIONS

Cleveland County: Piggott & Law 1 Hood, NW NW NW 6-10n-1e, dry, T.D. 6,630 ft., Hunton 5,970 ft., Viola 6,325 ft., Trenton 6,375 ft., second Wilcox 6,623 ft.

Comanche County: Texas 1 Conway, NW SW SE 3-3n-10w, dry, T.D. 2,512 ft., shaly sand 1,418 ft. with show oil and gas, sand 1,557 ft.

Haskell County: LeFlore Gas & Electric 1 Investment Mortgage Co., SE SE 32-9n-21e, dry, T.D. 5,397 ft., Cromwell 4,469 ft., Hunton 5,123 ft., Viola 5,236 ft., Wilcox 5,316 ft., second Wilcox 5,387 ft.

Lincoln County: Link Oil 1-A Langley, NW NE SE 11-16n-6e, dry, T.D. 3,428 ft., Prue 2,685 ft., Bartlesville 3,028 ft., Viola 3,352 ft., Wilcox 3,420 ft.

Okfuskee County: C. W. Titus 1 Midco, NE NE SW 23-10n-8e, dry, T.D. 3,635 ft., Bartlesville 2,749 ft., Wapanucka 3,604 ft., Cromwell 3,620 ft.

Pawnee County: George Blaylock 1 Campbell, SE NE SE 5-20n-5e, dry, T.D. 3,683 ft., Oswego 3,042 ft., broken Skinner 3,293 ft., Bartlesville 3,461 ft.

Pottawatomie County: Chas. Balph 1 Pool, NE NE NE 6-9n-4e, pumped 100 bbl., Wilcox 5,227-30 ft., T.D. 5,234 ft.

Seminole County: Newt 1 McGinnis, W½ NW NW 27-10n-6e, dry, T.D. 4,743 ft., Hunton 4,353 ft., Viola 4,613 ft., Wilcox 4,735 ft.

W. J. Martin 1 Essley, NW NW SE 34-7n-5e, dry, T.D. 4,345 ft., Mayes 3,660 ft., Viola 4,047 ft., dolomite 4,135 ft., second Wilcox 4,320 ft.

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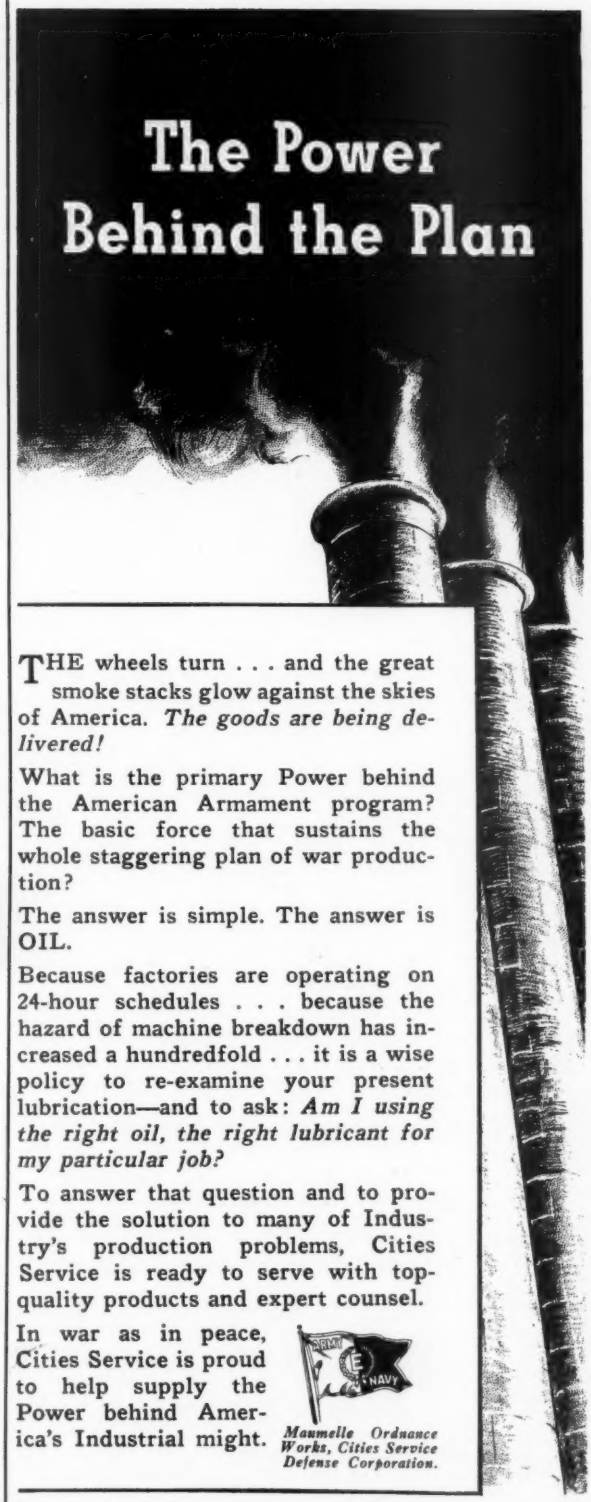

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N. CENTRAL TEXAS

Two New Strawn Fields Found in Wichita County

WICHITA FALLS, Tex.—Southern Wichita County gained two new Strawn sand fields during the week.

Two miles south of Wichita Falls, in Block 5, Cherokee County School Lands, Consolidated Oil Co. 1 Laukhuff perforated casing from 4,415-32 ft. with 68 shots, and from 4,440-65 ft. with 100 shots, and treated with acid. After being shut in for 12 hours the swab was run once, and the well made a flow over the mast head, and was shut in for another 12-hour period. It again made a flow of 50 per cent oil and the balance acid water and drilling water, and was allowed to flow for a short time before being shut in for storage. Casing pressure tested 650 lb. with 1,950 lb. bottom-hole pressure at the end of the test.

One and one-half miles west of Wichita Falls, Continental Oil Co. 1 West, G. W. Scott Survey, swabbed 60 bbl. of oil and a slight amount of water in 24 hours from 4,230-60 ft. and was preparing to complete. It was drilled to total depth of 5,687 ft., topping K.M.A. at 4,264 ft., Caddo at 5,214 ft., Mississippi at 5,302 ft. and Ellenburger at 5,520 ft.

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DEPENDABLE GULF STATES UTILITIES CO. PUBLIC SERVICE

Young County.—Deep Rock Oil Co. 1 Morrison, 330 ft. from the south and east lines of the north half, F. McLaurin Survey, 2 miles east of Bunger, topped Mississippi lime at 4,439 ft., with a stain and odor of oil from 4,439-44 ft. A core from 4,444-59 ft. was lime showing oil. After running electric log 5½-in. casing was set at 4,441 ft. A new 5,000-ft. wildcat is Anderson-Prichard Oil Corp. 1 H. C. Myers and A. A. Walsh unit, 1,728 ft. from the east line of the J. W. Walsh Survey A-1553 and 1,416 ft. from the south line of J. W. Walsh Survey A-1552, but in Walsh Survey A-1553, 11 miles northwest of Eliasville.

Archer County.—Chapman & McFarlin 1 J. H. Turberville, Section 182, T. P. Glass Survey, 6 miles southeast of Mankins, had a slight show of oil in sandy lime drilled from 3,899 to 3,903 ft. and was coring ahead. Gulf Oil Corp. 1 Parish, Section 97, A.T.N. C.L. subdivision, topped Caddo at 4,875 ft., Ellenburger at 5,278 ft., and was drilling below 5,500 ft. S. D. Johnson 1 Coleman, 2 miles north of Scotland, total depth 6,014 ft., had good showings of oil and gas from 5,696 to 5,717 ft. while cleaning out preparing to shooting. Two and one-half miles west of Holiday, G. E. Kadane & Sons will drill 1 J. R. Parkey, 3,300 ft. from north and 1,980 ft. from the east lines of S.P.R.R. Survey A-419 to 5,000 ft.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: F. T. Johnson 1 W. O. Wright, W. E. Probert Sur., dry, T.D. 1,453 ft.

J. L. McMahon 1 Claude Deskin est., 600 ft. from N, 600 ft. from W, Sec. 15, Blk. 5, Clark & Plumb subd., dry, T.D. 1,125 ft.

Baylor County: Continental Oil 1 E. W. Hunt, 330 ft. from N and W, Sec. 28, J. Garner Sur., elev. 1,380 ft., Caddo 5,316 ft., Mississippi 5,639 ft., Ellenburger 5,992 ft., dry, T.D. 6,170 ft.

Clay County: Bridwell Oil 1 Harrison & Allen, 892 ft. from SE, 1,000 ft. from SW, Jane Duncan Sur., dry, T.D. 1,960 ft.

Montague County: W. B. Omohundro 1 Mose Fowler, 5,877 ft. from S, 3,141 ft. from W, R. M. Davis Sur., dry, Caddo 6,052 ft., T.D. 6,314 ft.

Throckmorton County: White & Duncan 2 White & Duncan, 990 ft. from S and E, Blk. 50, Comanche Indian Reserve, dry, T.D. 947 ft.

Young County: Tolbert Drlg. and Continental Oil 1 M. K. Graham, 467 ft. from S and W, Sec. 2398, T.E.&L. Sur., S.G. 810-15 ft., Caddo 3,715 ft., Mississippi 4,493 ft., dry, T.D. 4,702 ft.

WEST CENTRAL TEXAS

ABILENE, Tex. — Anzac Oil Co. 50-J J. P. Morris, NE NW NE Section 721, William B. Tantly Survey, 2 miles west of Echo, Coleman County, topped Ellenburger lime at 3,403 ft., which was considered high for the area, and was drilling ahead with no shows reported.

One-half mile east of their abandoned wildcat, Hunter & Hunter have staked location for No. 2 Dorothea

(Continued on Page 256)

PETROLEO INTERAMERICANO

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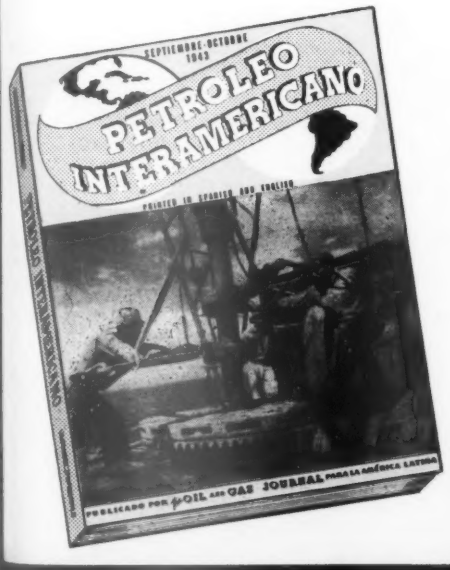

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SEPTEMBER-OCTOBER ISSUE TO BE MAILED AUGUST 15TH

LOUISIANA GULF

Fifth Operator Enters Newly Discovered Bear Pool

NEW ORLEANS, La.—Humble Oil & Refining Co. has entered the Bear field, opened in Beauregard Parish last April by General Crude Oil Co., making five operators now active in that pool. The others are Magnolia Petroleum Co., Phillips Petroleum Co., and Shell Oil Co., Inc. The test spotted by Humble is 1 Krause and Managan Lumber Co., 28-6s-9w. Contract depth is 6,600 ft. Two wells have been completed in the Bear field. The discovery came in with initial production of 151 bbl. The second, finished in June, was Phillips 1 First National Bank of Beaumont, with initial yield of 348 bbl. In both wells the production is from the 6,500-ft. level. Phillips has spotted its 3 First National Bank of Beaumont. Sohio Producing Co. 1 Lutcher-Moore Lumber Co., 1¼ miles west of Fields, Beauregard Parish, shut down for repairs, will begin coring again at 9,000 ft.

St. Charles Parish.—Gulf Refining Co. is getting ready to drill its next test in the Bayou Couba field. The well, 11 Delta Securities Co., in 18-15s-22e, is scheduled to go to 12,000 ft. It had been intended to drill No. 10, on the same lease, to 12,000 ft., but it went into salt and was abandoned.

Acadia Parish.—On a 5-hour gage Continental Oil Co. 1 Acadia Parish School Board, a mile north of the Richie field, flowed at the rate of 223 bbl. daily through 9/64-in. choke, with tubing pressure of 2,250 lb. and gas-oil ratio of 1,100. It was still testing as the week closed. Amerada Petroleum Corp. 1 Daigle, 1¼ miles northeast of Church Point, was drilling at 7,110 ft. in shale. Continental was testing also at 5-D Homeseekers, in the Tepetate field, after plugging back from 10,598 ft. to 9,150 ft.

Calcasieu Parish.—W. T. Burton was moving in for 1 Erwin estate, an 11,000-ft. test 7 miles south of Lake Charles. Union Sulphur Co. was drilling at 5,758 ft. in sandy shale and lime at 1 Starks & Brown, 26-11s-12w, second test in the Gum Cove area.

Terrebonne Parish.—Humble C-1 Continental Land & Fur Co., 4 miles south of the Gibson field, was drilling at 8,928 ft. in shale, with streaks of lime. An electrical survey from 8,013 ft. is said to have indicated no shows of oil or gas. Union Oil Co. of California ran an electrical survey at its wildcat test, 1 Calvert & Todd, a mile north of Houma, and at last report was waiting for orders at a total depth of 12,000 ft. Union Producing Co. 1 Fitzpatrick & Vizard, 77-19s-17e, which has established the deepest production in the world, is now shut down, pending completion gage and erection of storage tanks and separators. The well flowed 5,970,000 cu. ft. of gas and an ungaged volume of distillate.

Cameron Parish.—Continental was drilling at 10,235 ft. at 1 Adolph Hebert, Jr., in the Big Lake area.

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North Central Texas

(Continued from Page 254)

Griffin, 660 ft. from the south and 4,620 ft. from the west line of a 520-acre lease in Hood County School Land, 1 mile north of Goldsboro, almost on the Taylor County line. The first test went to 3,986 ft. and had a slight show of oil in sand at 3,916-50 ft.

Contract depth of 4,750 ft. was reached at Shell Oil Co., Inc. 1 J. B. Matthews, Section 35, Blind Asylum Land, southeast of Albany, Shackelford County, and no shows were reported in the test, the deepest in this locality.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Coleman County: Sohio Oil 1 Sealy-Smith, 660 ft. from N, 1,980 ft. from W, Sec. 95, Blk. 2, G.H.&H. Ry. Sur., dry, T.D. 3,560 ft.

Shackelford County: Roeser & Pendleton 2-A-111 W. I. Cook est., 990 ft. from S and E, Sec. 111, E.T.R.R. Sur., elev. 1,825 ft., T.D. 1,670 ft.

Taylor County: F. W. Merrick 1 R. B. Wells, NE cor. S. Darden Sur., dry, T.D. 2,798 ft.

EASTERN TEXAS

Cotton Valley Test Staked In Harrison County

DALLAS, Tex.—Siosi Oil Co. of Fort Worth, Tex., has staked location for a 9,000-ft. test in eastern Harrison County, Texas, 1 Armstrong, 1,900 ft. south and 650 ft. east of the northwest corner of the Armstrong 640-acre tract in the Daniel Rouse Survey, 1 mile northwest of Jonesville. The new location falls 6 miles north of First National Petroleum Trust 1 Armstrong which indicated production from the Travis Peak topped at 5,908 ft., and made 61.75 bbl. 45-gravity oil through perforations 6,078-84 ft. in September 1942. The new test is projected to the Cotton Valley formation, if shallower zones are found barren.

Bowie County. — Permac Oil Co. 1 E. A. Tidwell et al is a new wildcat, 704 ft. from east 618 ft. from the south lines of a 40-acre tract out of 128 acres in the J. W. Weaver Survey, in the southwest part of the county. It is a Paluxy sand test.

Angelina County.—A new wildcat is J. R. Meeker 1 John Massengill, 609 ft. from northwest and 715 ft. from the northeast lines of a 25-acre tract, or 5,650 ft. from southwest, 2,000 ft. from southeast of Sanitago Erie Survey, 2½ miles northwest of Homer.

Houston County.—Continental Oil Co. will drill 1 A. Fidell, 7,080 ft. from northeast and 1,600 ft. from the northwest lines of the M. J. Chamar Survey, 12 miles northwest of Lovelady. It is to be a 5,000-ft. slim-hole rotary test.

Deep Tests

Hunt County.—Stanolind Oil & Gas Co. 1 Caston, north offset to a recent Paluxy sand pool opener northwest of Campbell, appeared to have missed production when it was drilled into Paluxy and a drill-stem test from 4,670 to 4,724 ft. showed brackish water. Top of the Paluxy was called at 4,518 ft., where a fault was cut.

Kaufman County.—Sun Oil 1 Rutledge, Parsons Survey, was drilling below 9,020 ft.

Morris County.—Humble Oil & Refining Co. 1 H. N. Wright was drilling shale and sand at 7,621 ft. after a core from 7,490 to 7,541 ft. had no shows.

Wood County. — Jackson & Fisher 1 McCarley, Hazard Anderson Survey, which dropped casing in the hole, was plugged back to 4,240 ft. preparatory to whipstocking.

EAST TEXAS COMPLETIONS

Wildcats

Rusk County: Trentman Oil 1 L. H. Evans, 330 ft. from NE, 1,780 ft. from W, T. J. Hopgood Sur., elev. 387 ft., Pecan Gap 3,052 ft., Austin 3,907 ft., Woodbine 4,087 ft., Georgetown 4,149 ft., dry, T.D. 4,357 ft.

Van Zandt County: Hunt Oil 1 Lawrence Parker, 330 ft. from SE, 887 ft. from SW, J. Sparks Sur., elev. 427 ft., Pecan Gap 2,130 ft., Austin 3,274 ft., Woodbine 4,200 ft., Georgetown 5,000 ft., Paluxy sand 6,138 ft., dry, T.D. 6,433 ft.

Fields

Cayuga, Anderson County: Tide Water-Seaboard 1 R. E. Barton, S. Edmondson Sur., dry, T.D. 4,075 ft.

Hawkins, Wood County: Humble Oil & Ref. 11-D B. F. Allen, 856 ft. N of SW cor. Brewer Sur. and SE cor. Wideman Sur. on common line, elev. 369 ft., flow 189 bbl., Woodbine sand pay 4,805 ft., perf. 23 shots 4,805-12 ft., P.B. to 4,816 ft. from T.D. 4,834 ft.

Humble Oil & Ref. 1-B Lynch et al, 522 ft. from S, 500 ft. from NW of 40-ac. unit, Pollock Sur., elev. 393 ft., flow 555 bbl., T.D. 4,628 ft.

Kildare, Cass County: Rogers Lacy 1 Davis-Lacy, 1,245 ft. from E, 3,680 ft. from S, Gideon Sur., flow 591 bbl., perf. 48 shots 6,018-30 ft., T.D. 6,052 ft.

C. H. Lyons 1 Geo. Wilson heirs, 467 ft. from N and E, 100-ac. tract, B. W. Hopson Sur., flow 96 bbl., perf. 61 shots 6,002-36 ft., acid 5,000 gal., T.D. 6,068 ft.

Texas Co. 2 Berry Davis, 475 ft. from N, 467 ft. from E, B. W. Hopson Sur., elev. 236 ft., flow 267 bbl., pay 6,010-16 ft., Gloyd sand, P.B. to 6,028 ft. from T.D. 6,043 ft.

Quitman, Wood County: Shell Oil 1 J. J. Blalock, 761 ft. from N, 619 ft. from W, 43.27-ac. tract, E. Goodsir Sur., elev. 444 ft., flow 778 bbl., 42 gravity, pay 6,245 ft., T.D. 6,465 ft.

Shell Oil 5 J. B. Goldsmith, 660 ft. from N, 3,461 ft. from W, 608.11-ac. tract. W. W. Lanier Sur., elev. 477 ft., flow 518 bbl., 43 gravity, pay 6,345 ft., T.D. 6,562 ft.

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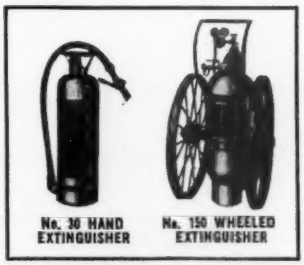

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BAROID or COLOX—Muds suitably weighted with these materials hold caving or heaving formations in place.

TABILITE—This superior chemical mud thinner reduces viscosity and gel-strength and improves walling qualities.

BAROID or COLOX—Highly necessary to control gas and other pressures.

AQUAGEL—Always carry a sufficient amount in all muds to keep water loss low and cake thin.

TABILITE—Reduces danger of blowouts by releasing entrained gas, thereby keeping mud weight constant.

SMENTOX—When drilling ahead after a cement job, SMENTOX counteracts the effect of cement in mud. A small amount added to mud after a cement job often eliminates necessity of discarding mud.

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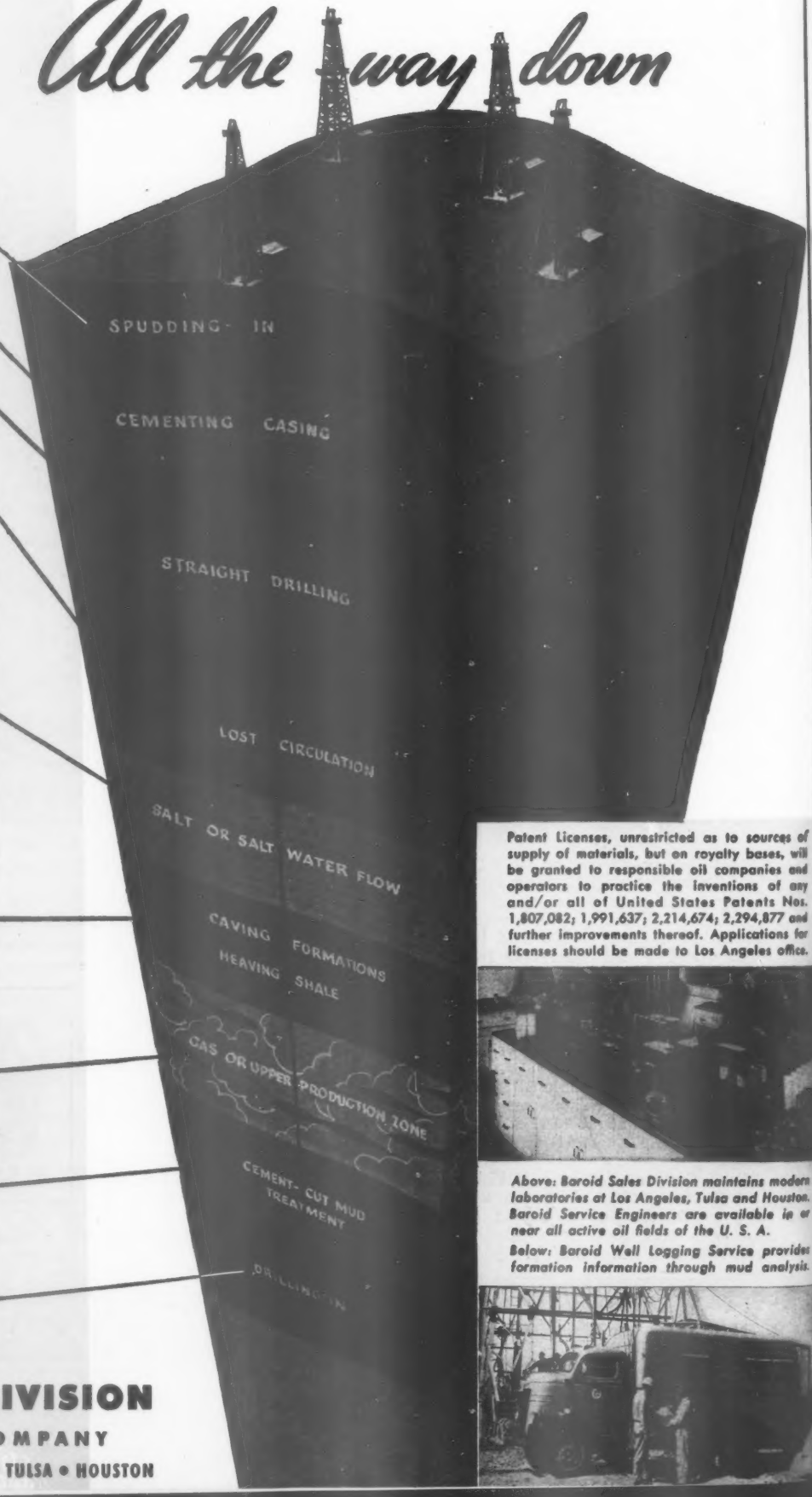

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PERMIAN BASIN

Barnhart Field Extended One Mile North

MIDLAND, Tex.—Amerada Petroleum Corp. 1 Mary Johnson, in Section 5, H.E.&W.T. Ry. Survey, 1 mile north of production in the Barnhart pool of southeast Reagan County, extended the field when it flowed 57 bbl. oil in 11 hours from Ellenburger at total depth of 9,075 ft. Packer was set at 8,943 ft., and a water blanket of 1,000 ft. was used. After drilling to 9,100 ft. on another drill-stem test, the well flowed 95 bbl. in 7 hours. This is the first well in the pool drilled on lands other than that owned by the University of Texas, and will cause further drilling on the north end of the field. One-half mile southwest, Amerada 1 Hickman, SE SE Section 4, H.E.&W.T. Sur., was drilling below 5,000 ft.

Andrews County: Humble Oil & Refining Co. 1 W. F. Carter, Section 23, Block A-46, Public School Land, indicated possible production from lower Permian lime when it showed oil in a core taken from 5,646-64 ft., and recovered a bleeding core from 5,664-82 ft. Drill-stem test from 5,632-82 ft., open 45 minutes, showed 55 ft. of drilling mud with only a trace of oil, and operators were drilling ahead below 5,769 ft. Union Oil Co. of California 1 J. D. Biles, NW NE Section 19, Block A-31, Public School Land, northwest of the Fullerton Clear Fork pool, showed some staining in samples taken from 6,795 ft. Humble 1 Crews and Mast, SW SE Section 8, Block A-34, Public School Land, west of the Means pool, was drilling ahead below 7,620 ft. After passing shows of oil from 4,900-14 ft. and 5,950-62 ft.

Pecos County: Standard Oil Co. of Texas 1 Douglas Oil Co. et al, SE SE Section 9, Block 194, G.C.&S.F. Survey, Ordovician discovery on the west side of Yates pool, perforated at 8,697-8,732 ft., was acidized with 5,000 gal. using 1,800-lb. pressure to break into formation, and was swabbing. A new Ellenburger wildcat is Bryce McCandless 1 W. W. Turney, SE SE Section 19, Block 141, T.&St.L. Ry. Survey, 2½ miles east of Baldridge and 7 miles southeast of the Apco-Warner pool. It is to start by August 1 and is contracted to 5,500 ft.

Gaines County deep tests: Amerada 6 Robertson drilling below 8,528 ft. Stanolind Oil & Gas 15 American Warehouse drilling below 10,600 ft. Continental 1-A Jones drilling 5,630 ft.

Winkler County: Operations are to begin immediately on a north offset to the Keystone-Ellenburger discovery, being Amon G. Carter C-3 J. B. Walton, NW NE Section 1, Block B-2, Public School Land, and applications have been made for south and west offsets, being Richardson & Bass 10-E and 11-E Walton.

New wildcats were announced for scattered areas in the basin. In southwest Cochran County, Sunray Oil Co. will drill 1 Reed in SE SW Section 57, Block A-26, Harrison & Brown Survey, and in the same county, 1 mile northeast of Lehman, Helmerich & Payne will drill 1 C. C. Slaughter, 660 ft. from the north and east lines, Labor 1, League 116, Potter County School Land. Another test for this county, details of which are not available, is slated to be drilled in Section 15, Block Y, Public School Land, 4 miles south of Bledsoe.

In Coke County, Harley Sadler 1 J. P. Mims is located 330 ft. from the north and 2.310 ft. from west lines, Section 46, Block W, T.&P. Ry. Survey.

In Crockett County, Ben Banner 1 H. L. Blair is located 4,414 ft. from the north and 692 ft. from west lines, Section 43, Block 1, I.&G.N. Ry. Survey.

In Crane County, Rio Bravo Oil Co. 1 fee is located 330 ft. from the northeast and northwest lines, Section 31, Block 1, H.&T.C. Ry. Survey.

An Ellenburger test for Menard County is B. A. Duffy 1 Lula Clark, 660 ft. from the north and 1,980 ft. from the west lines, Section 3, A.B. &M. Survey, 8 miles northwest of Menard.

WEST TEXAS COMPLETIONS

Wildcats

Andrews County: Magnolia Pet. 1 B. B. Ralph, O.W.D.D., 660 ft. from N and E, Sec. 20, Blk. A-38, Public School Land, elev. 3,420 ft., dry, T.D. 8,416 ft., drilled deeper from O.T.D. 6,434 ft., temp. abd.

Crockett County: Moore Bros. 1-32 Shannon, 660 ft. from S, 1,980 ft. from W, Sec. 32, Blk. 1, G.C.&S.F. Ry. Sur., elev. 2,514 ft., dry, T.D. 1,892 ft.

Fields

Crockett, Crockett County: F. & J. Oil Co. 6 University, 1,650 ft. from N, 2,004 ft. from W, Sec. 17, Blk. 14, University Sur., elev. 2,411 ft., pump 19 bbl., pay 1,521-50 ft., shot 100 qt., P.B. to 1,550 ft. from T.D. 1,607 ft.

Emperor Deep, Winkler County: C. V. Lyman 5 E. W. Cowden, 1,650 ft. from N, 2,310 ft. from E, Sec. 27, Blk. B-5, Public School Land, elev. 2,821 ft., flow 565 bbl., pay 2,840 ft., shot 250 qt., T.D. 2,965 ft.

Johnson, Ector County: Atlantic Ref. 5 J. L. Johnson, 1,980 ft. from N, 600 ft. from S, 510 ft. from W, NE Sec. 43, Blk. 42-1s, T.&P. Sur., elev. 2,981 ft., pump 375 bbl., pay 4,120 ft., shot 277 qt., T.D. 4,210 ft.

McCamey, Upton County: Maloney Drlg. 2 Ed. S. Hughes, 660 ft. from N and E, Wm. Teer Sur., elev. 2,526 ft., I.P. 9 bbl., pay 2,010 ft., T.D. 2,160 ft.

Noelke, Crockett County: D. Breeding 1 State, 1,378 ft. from E, 719 ft. from S, Sec. 71½, Blk. GG, dry, T.D. 2,247 ft.

Embar-Ellenburger, Andrews County: Phillips Pet. 29 University-Andrews, NW NW Sec. 31, Blk. 10, University Sur., elev. 3,236 ft., flow 189 bbl., Ellenburger pay 7,980 ft., perf. 60 shots 7,980-95 ft., T.D. 8,049 ft.

Slaughter, Cochran County: Devonian Oil 29-A R. F. Duggan, 560 ft. from S and W, Lab. 6, Lge. 55, Oldham County School Land, elev. 3,104 ft., flow 878 bbl., lime pay 5,015 ft., acid 12,000 gal., T.D. 5,056 ft.

Superior Oil 11 C. S. Dean, 3,278 ft. from E, 1,573 ft. from S, Lge. 57, Martin County School Land, elev. 3,684 ft., flow 441 bbl., lime pay 4,913 ft., perf. 4,970-78 ft., acid, T.D. 4,984 ft.

Slaughter, Hockley County: T. F. Morrow 25 Mallett, 580 ft. from S and W, Lab. 13, Lge. 48, Edwards County School Land., elev. 3,603 ft., flow 974 bbl., lime pay 4,942 ft., acid 16,000 gal., T.D. 4,975 ft.

T. F. Morrow 29 Mallett, 580 ft. from S and W, Lab. 12, Lge. 48, Edwards County School Land, elev. 3,615 ft., flow 866 bbl., lime pay 4,950 ft., acid, T.D. 4,987 ft.

T. F. Morrow 30 Mallett, 580 ft. from S and E, Lab. 12, Lge. 48, Edwards County School Land, elev. 3,605 ft., flow 428 bbl., lime pay 4,940 ft., acid 12,000 gal., T.D. 4,983 ft.

Walker, Pecos County: Cardinal Oil 1-F University, 1,625 ft. from N, 330 ft. from E, Sec. 14, Blk. 16, University Sur., elev. 2,918 ft., flow 84 bbl., pay sand 2,042 ft., shot 40 qt., T.D. 2,057 ft.

Wasson, Yoakum County: C. B. King and Bay Pet. 1 Lloyd Dowell, 880 ft. from S and W, Sec. 896, Blk. D, J. H. Gibson Sur., elev. 3,607 ft., flow 795 bbl., pay lime 4,965 ft., acid 6,000 gal., T.D. 5,039 ft.

Winters, Runnels County: Pawnee Royalty 2 David, 660 ft. from S and E, Sec. 330, Blk. 64, F. J. Ford Sur., 297.2-ac. lease, elev. 1,800 ft., I.P. 17 bbl., 60 per cent water, 42 grav., pay 2,460 ft., T.D. 2,483 ft.

PANHANDLE COMPLETIONS

Armstrong County: Stanolind Oil & Gas Co. 1 Corbin, Sec. 275, Blk. B-4, H.&G.N. Ry. Sur., south of Claude, was drilling below 5,655 ft.

Gray County: Coronado Oil 1 Maggie Hopkins, 330 ft. from N and E, Sec. 66, Blk. 2, H.&G.N. Ry. Sur., elev. 3,032 ft., flow 175 bbl., pay 2,872 ft., T.D. 2,905 ft.

Texas Co. 8-F W. H. Taylor, 555 ft. from E, 765 ft. from S, Sec. 37, Blk. B-2, H.& G.N. Ry. Sur., elev. 2,966 ft., I.P. 146 bbl., T.D. 2,830 ft.

Hutchinson County: Phillips Pet. 4 Whittenberg, 2,210 ft. from S, 330 ft. from W, Sec. 62, Blk. 46, H.&T.C. Ry. Sur., elev 2,918 ft., I.P. 119 bbl., pay 2,857 ft., T.D. 2,895 ft.

Southeast New Mexico

HOBBS, N. M.—Two new wildcats were announced for the district during the past week. In Eddy County, 3 miles northwest of the Russell pool, Mac T. Anderson will drill 1 J. D. Millman in C NW SE 33-19s-28e. In McKinley County, Charles H. Dibble will drill 1 Santa Fe, 2,310 ft. from north, 820 ft. from east lines, 29-30n-9w. Materials were being moved into location for Humble Oil & Refining Co. 1 Federal-Leonard, Ordovician wildcat, SW SW 12-26s-37e, southeast Lea County.

SE. NEW MEXICO COMPLETIONS

Loco Hills, Eddy County: Robt. E. McKee 1 State, NW NW 32-17s-30e, flow 150 bbl., lime pay 2,578 ft., acid 3,000 gal., T.D. 2,962 ft.

South Eunice, Lea County: Tex. Pac. C. & O. 29 State, NW NW, 8-22s-36e, flow 190 bbl., lime pay 3,820-60 ft., acid 4,000 gal., T.D. 3,860 ft.

Square Lake, Eddy County: McDannald & Williams 4 Grier, 660 ft. from S, 1,684 ft. from W, 31-16s-31e, flow 39 bbl., lime pay 3,180 ft., T.D. 3,576 ft.

Vacuum, Lea County: Neville G. Penrose, Inc., 1 State-So. Pet. Ex., 330 ft. from S, 660 ft. from W, 24-17s-35e, pump 8 bbl., P.B. to 4,591 ft. from T.D. 4,593 ft.

OHIO, KENTUCKY

Oil and Gas Extensions In Week's Operations

ZANESVILLE, Ohio.—The Sandyville gas field was extended 1½ miles to northwest of Obermiller's Unger well in Section 6, Pike Township, Stark County. The well gaged 1,004,000 cu. ft. from the Clinton sand at 4,681-4,911 ft. with a rock pressure of 1,300 lb. Another good well was completed in the field by the Natural Gas Co. of West Virginia on the Diana Hazlett tract in Lot 23, Sandy Township, Tuscarawas County, having an open flow at 4,257,000 cu. ft.

The Mavromatis well in Section 15, Madison Township, Perry County, opened another oil-producing area northeast of the Clayton pool. The well was good for 60 bbl. and 720,000 cu. ft. at 3,294-3,362 ft. The Pure Oil was unsuccessful in their endeavor to extend the old Bremen field to the southeast. Only a small show of oil was found in the Clinton sand.

OHIO COMPLETIONS

Ashland County, Lake Township: Ohio Fuel 1 Charles Dilgard, Sec. 23, Clinton, dry, T.D. 3,029 ft.

Athens County, Canaan Township: C. W. Nuzum 2 William W. Marshall, Sec. 2, Berea, dry, T.D. 1,607 ft.

Coshocton County, Clark Township: Ohio Oil 1 Lyle Teeling, Lot 22, Clinton, 14 bbl., T.D. 3,300 ft.

Pike Township: A. Willey et al 5 Thomas McKee, Sec. 23, Clinton, 31 bbl., T.D. 3,175 ft.

Holmes County, Killbuck Township: Kemrow 7 L. Carpenter, Sec. 17, Clinton, 235,000 cu. ft., T.D. 3,616 ft.

Medina County, Granger Township: Ohio Fuel 1 J. H. Dippell, Lot 41, Clinton, 1,330,000 cu. ft., T.D. 3,577 ft.

Ohio Fuel 1 S. E. Robinson, Lot 63, Clinton, 429,000 cu. ft., T.D. 3,612 ft.

Meigs County, Bedford Township: Ohio Fuel 1 Earl Sapp, Sec. 30, Berea, 43,500 cu. ft., T.D. 1,647 ft.

Morgan County, Homer Township: D. T. Orndoff 6 S. V. Dale, Sec. 3, Berea, 50,000 cu. ft., T.D. 1,329 ft.

Marion Township: Ohio Fuel 6 N. M. Wood, Sec. 34, Salt sand, 979,000 cu. ft., T.D. 904 ft.

Muskingum County, Perry Township: Wittmer 2 G. W. Wilson, Sec. 18, Clinton, 400,000 cu. ft., T.D. 4,258 ft.

Salt Creek Township: Preston Oil 1 C. L. Taylor, Sec. 17, Clinton, 16 bbl., T.D. 4,225 ft.

Noble County, Enoch Township: H. H. Mosely 6 A. C. Weisant, Sec. 33, Stray, dry, T.D. 800 ft.

Perry County, Clayton Township: Preston Oil 1 F. G. Rhoades, Sec. 5, Clinton, dry, T.D. 3,308 ft.

Jackson Township: Kissling Drlg. 1 H. Householder, Sec. 35, Berea, dry, T.D. 969 ft.

Madison Township: Atha 1 George Mavromatis, Sec. 15, Clinton, 60 bbl. and 720,000 cu. ft., T.D. 3,366 ft.

Preston Oil 1 O. N. Ford, Sec. 33, Clinton, 22 bbl. and 757,000 cu. ft., T.D. 3,217 ft.

Monroe Township: Ira Coffman 13 John Denman, Sec. 27, Berea, 1 bbl., T.D. 1,142 ft.

Pike Township: Pure Oil 2 M. A. Schneider, Sec. 21, Clinton, dry, T.D. 3,515 ft.

Thorn Township: Palm Oil 2 H. S. Poulson, Sec. 14, Clinton, dry, T.D. 2,740 ft.

Stark County, Pike Township: Obermiller 1 G. W. Unger, Sec. 6, Clinton, 1,004,000 cu. ft., T.D. 4,711 ft.

Summit County, Bath Township: Wiser Oil 1 Charles Hershey, Lot 15, Clinton, dry, T.D. 3,698 ft.

Tuscarawas County, Sandy Township: Nat. Gas W. Va. 2 Diana Hazlett, Lot 23, Clinton, 4,257,000 cu. ft. gas, T.D. 4,913 ft.

EASTERN KENTUCKY

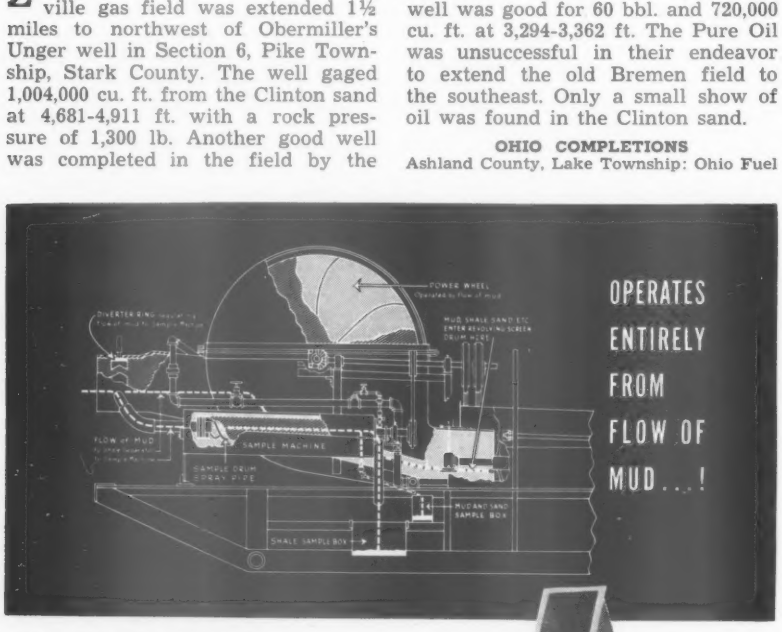
ASHLAND, Ky.—Jackson County entered the eastern Kentucky spotlight this week with the completion of a good oil well near the junction of the Jackson, Owsley and Clay County lines.

The well, drilled by E. C. Dyer et al on Blackwater Creek northeast of McKee, is considered capable of producing 50 to 75 bbl. of oil daily and has not been shot. The approximate total depth is 1,050 ft. in Devonian lime and reports indicate that it may open a new pool.

The Kentucky-West Virginia Gas Co. reports completion of 5466 Spurlock Adkins, in Pike County, with a daily open flow of 3,320,000 cu. ft. of gas. The well was drilled to a total depth of 1,464 ft. in Maxon.

The Inland Gas Corp. has completed 244 Eliza Nickels et al on Big

(Continued on Page 273)



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TEXAS GULF COAST

Much Leasing Activity in Waller and Austin Counties

HOUSTON, Tex.—Geophysical and leasing activity in Waller County point to likelihood of development work in that area in the not far distant future. William Wagner, of San Antonio, and associates, who have been obtaining leases in the Hempstead townsite for several months, are now leasing just outside the townsite. According to report, they will drill a deep test on the townsite soon. Sun Oil Co. is blocking acreage in the northeastern part of the county, in the William Baird Survey locality. Stanolind Oil & Gas Co. already has holdings in that vicinity. Leases are being sought east and north of the big Katy oil and gas-distillate field. Lease buyers are reported busy too in Austin County in the J. E. Gross Survey, near the Raccoon Bend field. In the William Harper Survey, Raccoon Bend area, Pan American Production Co. has staked location for a wildcat, 1 Austin College. South of the Katy field, in Waller County, Sun has finished 1 Alt as a gas well after setting casing at 7,319 ft.

Colorado County.—Supposedly in preparation for production tests, Magnolia Petroleum Co. cemented 7-in. casing at 9,960 ft. at 1 Anderson Brothers, 1½ miles southwest of Chesterville. Drill-steem tests are reported to have shown gas and distillate. Total depth is 12,006 ft., and an electrical survey was run from there. Jack W. Frazier, John Mayo, and Cities Service Oil Co. have staked location for a wildcat test, 1 C. K. Gay estate, in the James Tomlinson League, at about the center of a 990-acre tract. It is planned to go to 8,500 ft.

Fort Bend County.—O. W. Killam Co. 1 Nesbitt, 1½ miles northwest of Fulshear, was shut down for repairs at 7,556 ft., where it was drilling in hard shale and lime streaks. Pure Oil Co. 1 A. C. Woods, 2¼ miles northeast of Fresno, was drilling in sand at 4,710 ft.

Harris County.—Ludeau Oil Co. 1 J. E. Ludeau, 3½ miles north of Houston, was repairing rig at 2,855 ft., where it had been drilling in shale. H. C. Cockburn 1 R. E. Allday, 2½ miles southeast of Dyersdale, was at 865 ft. in shale. Continental Oil Co. 1 J. S. Millenger, 2½ miles northwest of Aldine, was drilling at 4,690 ft. in shale and lime.

Jefferson County.—Humble Oil & Refining Co. and Shell Oil Co. 1-C McFaddin Trust, 5 miles southeast of La Belle field, encountered difficulty in running an electrical survey below 7,500 ft. and was circulating and mixing mud. Sun has derrick up for 1 B. E. Quinn, 5 miles northwest of Beaumont.

Montgomery County.—Gar-Flo and R. E. Hanrick 1 Calfee and Longmire, 4 miles northwest of Conroe, drilling in shale at 4,650 ft., tested slight gas odors. Electrical survey was run from 4,201 to 679 ft. Humble 1-B Texas Long Leaf Lumber Co., 1½ miles northwest of Splendora, was drilling at 8,880 ft. in shale.

Brazoria County.—Gulf Oil Corp. has staked location for a wildcat, 1 S. M. Allen, in the S. McNeil Survey, Allen dome. Tide Water Associated Oil Co. was drilling below 10,200 ft. in shale at 1 Mueller, in the Old Ocean field.

TEXAS GULF COAST COMPLETIONS

Wildcats

Fort Bend County: Roy Ranger and Jack W. Frazier 1 E. C. Burney, 3½ mi. SW of Katy, dry at 7,770 ft.
Harris County: Texas Co. 1 L. M. Josey, 3 mi. SW of Cypress, dry at 7,596 ft.
Jackson County: Continental 1 Dr. J. W. Weeks, 4 mi. E of Edna, dry at 6,592 ft.
Stanolind 1 W. Apelt, 5 mi. NE of Cordelle, dry at 5,500 ft.
George W. Strake 1 J. M. Bennett, 1½ mi. SW of La Salle, dry at 6,330 ft.
Jefferson County: Texas 1 J. E. Broussard et al, 7 mi. SE of Nome, dry at 8,495 ft.

Fields

Aldine, Harris County: Texas Producing
(Continued on Page 272)

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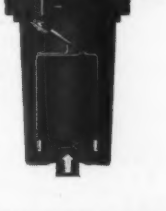

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SOUTHWEST TEXAS

Large Blocks of Acreage Change Hands in Hidalgo

CORPUS CHRISTI, Tex.—Developments of importance are foreshadowed by a transaction in Hidalgo County in which holdings on about 5,000 acres of land have been acquired by F. D. Davenport, John J. Sheerin, and J. B. O'Connor from Pantano Petroleum Co., McCollum Oil Co., and C. C. Small, trustee. Included are 3,979 acres of leases in La Blanca gas-distillate field, the Engleman B community lease, La Blanca community lease, and other acreage in Las Mestenas grant. The three buyers got 1,000 acres from Small in the Unit B community lease in Las Mestenas grant. Five completed gas wells and two contracts to supply gas to industrial plants figure in the deal. According to records filed, the deal was effected last March, with initial payment of $50,000. A second payment of $24,000 was made June 30. A third, of $10,000, was to be made in July. Remaining payments, totaling $200,000, are to be made from 1944 through 1947 in four annual installments. Plans for development of the properties have not been made public. The acreage is in the eastern part of the county.

Geophysical crews have been shooting the Mercedes area in Hidalgo County, and several thousand acres of land south of Weslaco and eastward to the Cameron County line are being blocked, giving rise to expectations that another new oil-prospecting program is in the making.

Arkansas Fuel Oil Co. has staked location for another Hidalgo County wildcat, 1 Mayer & Weil, a mile west of the Penitas field, and Texas Co. has spotted location for 1 American Investment Corp., 6 miles northwest of Mission. Projected depth is 7,500 ft. Seaboard Oil Co. will drill a wildcat, 2 Boston-Texas Land Trust Co., 5 miles east of the Rincon field.

Zapata County.—George Echols et al had 1 Volpe, 7 miles southeast of Zapata, rigged up and was ready to spud last week. It is planned to carry this wildcat to 7,000 ft. V. G. Schimmel had started making hole at 1 fee, a wildcat 15 miles southeast of Zapata. Texas was preparing to make a drill-stem test at 2 B. Hartman, 5 miles west of Guerra. Total depth was 1,940 ft. in sand, and oil odors had been reported. The same company was moving in at 3 B. Hartman, in the same survey with No. 2.

Bee County.—Transwestern Oil Co. and H. B. Zachary were rigging up for 1 Holzmark, 4 miles southeast of Mineral. Pure Oil Co. cemented 5½-in. casing at 5,058 ft. at 1 Nannie Tuttle, 2 miles southwest of Blanconia, and was waiting for cement to set. Mackhank Oil Co. was coring ahead from 7,230 ft. at 1 Freeland, deep wildcat test in the old Cosden oil field.

Refugio County.—Tide Water Associated Oil Co. was rigging up for 1 Rooke et al, wildcat test 1½ miles west of La Rosa.

Victoria County.—Darby Petroleum Co. has staked location for a wildcat test, 1 Joe D. Wray, 6 miles south of Inez.

Duval County.—H. J. Porter et al 1 C. M. Robinson, 2 miles southeast of the Fitzsimmons field, at total depth of 4,857 ft., killed the well, squeezed all perforations, and was waiting for cement to set. This wildcat on a test flowed 13 per cent oil and 87 per cent brackish water, with tubing pressure of 540 lb. and shut-in casing pressure of 770 lb. J. W. Gorman has staked location for 1 C. J. Bain, 5 miles north of the Casa Blanca field. Hiawatha Oil & Gas Co. was running an electrical survey from total depth of 5,335 ft. at 24 Southland Life Insurance Co., a mile north of the Southland field.

LOWER GULF COAST COMPLETIONS

Wildcats

Karnes County: Luling Oil & Gas Co. 1 J. Q. Smith, 4 mi. SE of Hobson field, dry at 4,758 ft.

San Patricio County: Coastal Refineries, Inc., and Henshaw Bros. 1 E. C. Caldwell, 2 mi. E of Edroy, dry at 6,404 ft.

Victoria County: Bridwell Oil Co. 1 N. M. Stoner, 4 mi. NW of Bloomington, dry at 6,210 ft.

Fields

Duck Bay, Calhoun County: Stanolind 21 State Tract 153, dry at 6,000 ft.

Hondo Creek, Karnes County: Phillips 1 Bankers, C. Martinez Sur., A-6, dry at 6,860 ft.

North Magnolia City, Jim Wells County: Humble 1 Nina Adams estate, 2 mi. NW of Magnolia City, 13,200 cu. ft. gas open flow, S.I. T.P. 1,975 lb., T.D. 5,964 ft., P.B. 5,165 ft.

Plymouth, San Patricio County: Plymouth Oil Co. 124-C E. H. Welder, E. Cameron Sur., A-97, 140 bbl. through 7/64-in. choke, T.P. 800 lb., C.P. 1,200 lb., gas-oil ratio 625, perf. 5,882-85 ft., T.D. 5,885 ft.

Porter, Karnes County: Cox & Hamon 2 Ben Johnson, V. Blanco grant, A-3, 138 bbl. through 9/64-in. choke, T.P. 550 lb., C.P. 690 lb., gas-oil ratio 459, T.D. 4,030 ft.

Seeligson, Kleberg County: Humble 18 King ranch-Cabeza, G.H.&R.R. Sur. 47, 119 bbl. through 9/64-in. choke, T.P. 1,500 lb., gas-oil ratio 2,270 lb., T.D. 6,792 ft.

Seeligson, Jim Wells County: Texas Gulf Producing Co. 1-A C. T. Hewitt, R. Ross Sur. 334, A-406, 38 bbl. pumping, perf. 5,244-58 ft., T.D. 6,107 ft., P.B. 5,595 ft.

Stratton, Kleberg County: Chicago Corp. 30 G. P. Wardner, Paso Ancho de Arriba grant, dry at 6,370 ft.

Woodsboro, Refugio County: Southern Minerals Corp. 4 R. H. Wood, D. A. Reojas Sur., 66 bbl. through 3/32-in. choke, T.P. 760 lb., S.I. C.P. 1,620 lb., gas-oil ratio 1,295, perf. 5,451-56 ft., T.D. 6,046 ft., P.B. 5,460 ft.

SOUTH CENTRAL TEXAS COMPLETIONS

Wildcats

Bell County: W. F. Collins 2 S. S. Nelson, 2½ mi. S of Temple, dry at 505 ft.

SOUTH TEXAS COMPLETIONS

Wildcats

Starr County: Baldridge & King 1 Mary Edgerton, 12 mi. NE Rio Grande City, dry at 4,510 ft., P.B. 1,227 ft.

Fields

Aviator, Webb County: O. W. Killam 1 J. C. Garcia, Los Ojullos grant, A-1397, dry at 4,024 ft.

Cadena, Duval County: Taylor Refining Co. 5 E. E. Cadena, Rios Sur. 304, A-1026, dry at 5,432 ft.

Driscoll, Duval County: Continental 17-B Clara Driscoll, S.K.&K. Sur. 445, 75 bbl. through ⅛-in. choke, T.P. 50 lb., C.P. 300 lb., gas-oil ratio 175, T.D. 3,955 ft., P.B. 3,305 ft.

Kreis, Duval County: Highland Oil Co. 2-A L. de la Garza, Francisco R. Cantu Sur.

(Continued on Page 271)

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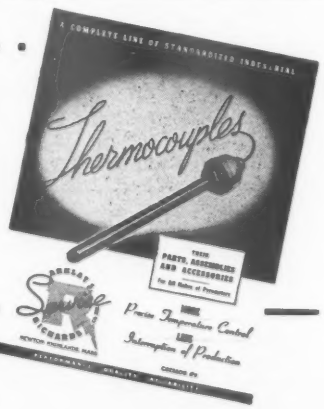

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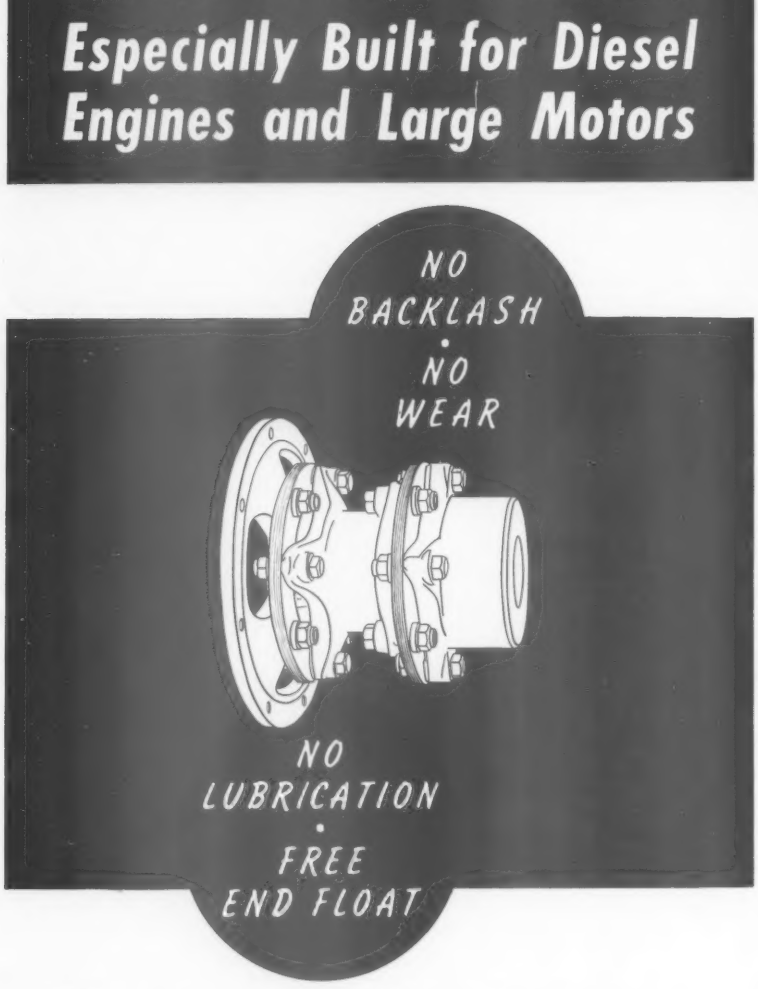

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THOMAS FLEXIBLE COUPLING CO.
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CANADIAN FIELDS

Vermilion Field Being Rapidly Developed

CHATHAM, Ont.—The outlook for the Vermilion field in eastern Alberta indicates rapid development in the last half of 1943. Since January 1, 12 wells have been completed, of which 10 were oil producers, one a large gasser and one abandoned. Two more are drilling; and contracts already signed indicate the year's total of completions may reach 40.

East of the Cannar wells, Holly 1, LSD 14, 20-50-5w4, drilled by O. R. Hollingsworth, got the pay sand at 1,790 ft. and is one of the largest producers in the field, with a settled production of 60 to 75 bbl. daily indicated.

On the east side of the field, Phillips-Vermilion 1, SW¼ 28-50-5w4, owned by British Empire Developments spudded on July 7 and set casing on a heavily saturated sand on July 11, with drilling time approximately 90 hours. Hole was cased with 5½-in. pipe, with a two-stage cement tool placed in the casing at 600 ft. through which cement was forced to make gas and water shutoffs to the surface. Completion of this producer has proved an additional 160 acres, and the company will drill several more wells.

Since the Vermilion Consolidated conditioning plant at Borrodaile resumed operations in May, some 69 cars, or 15,250 bbl. of clean oil have been shipped.

Vermilalta Oil Co. and Grande Prairie Oil Co. are arranging for a 30-well drilling program. P. D. Bowlen, formerly president of the Texas-Canadian Oil Co. will be in charge.

Operations of Cannar Oils, Ltd., may be expanded to include deepening of one of its wells to test the Lower Cretaceous and Palaeozoic lime.

Barnwell.—Levis & Gerke are preparing to drill in the Barnwell extension of the Taber field in southern Alberta. A previous test by Border Petroleums in a related area encountered strong oil showings with some water. The Levis & Gerke acreage has been reported on by Russell V. Johnson of Calgary who has determined a structural nose plunging to the northwest, with surface exposures of Belly River formation and potential structures in the Lower Cretaceous between 2,800 and 2,900 ft.

Alberta boundary.—Additional reservations close to the Alberta boundary have been taken up by McColl-Frontenac Oil Co., covering 54,400 acres in Townships 1 and 2, Ranges 17 and 18; and by Shell Oil Co. of

Canada, covering 53,771 acres, in Townships 2 and 3, same ranges. Holdings are close to the boundary, west of the Vanalta acreage in Red Coulee field and east of the Twin River and Del Bonita structures.

North Extension.—In the Turner Valley North Extension, British Dominion Oil & Development 5, LSD 5, 17-21-3w5, finished at 8,598 ft. with Madison limestone at 8,169 ft. is officially credited with initial production of 1,715 bbl. daily, after acidizing. The well is ¼ mile north of the previous most northerly producer. British Dominion is planning to drill Nos. 6 and 7 to test possibilities of a still further extension.

Southwest producer. — The proven area in the south end of Turner Valley has been extended more than ¼ mile by completion of Brown Oil Corp. 6, LSD 15, 5-18-2w5, drilled to 8,650 ft. with Madison limestone at 8,458 ft. Though the well was not carried into the lower porous zone of the limestone, it quickly filled a 1,000-bbl. tank after a light acid wash, and has since been connected with the pipe line. Heavier acid treatment will be given later. The oil is entirely water-free. Location is southeast of Northwest-Hudson's Bay 8 producer. Brown 6 is the first well in 5-18-2w5 to be carried to the Madison.

MICHIGAN

Drilling Activity at Peak As Production Drops

SAGINAW, Mich. — Michigan oilfield activities were at their peak for the year last week as 23 completions were recorded, the list including 10 oil producers for total initial potential production of 1,150 bbl., two natural-gas wells and 11 dry holes, six of which were wildcat tests.

The activity was spread through 13 counties. The best of the new wells was a Gulf Refining Co. producer in the Fork-Mecosta field which flowed 409 bbl. the first 19 hours. Another worthy completion was Daily Crude Oil Co. 2 Schnett, in the Winterfield-Clare area, good for 363 bbl. a day initially.

Nine more drilling permits were issued by the Conservation Department, three being for Clare County locations, two in Allegan, and one each in Roscommon, Mecosta, Ottawa and Antrim.

June production figures announced by the Michigan Oil and Gas Association revealed a moderate decline from May, caused principally by proration extensions. The June average was 56,618 bbl., 2,606 bbl. less than in May.

Test blocks show the difference between corrosive action of B-H INSULATING CEMENT and ordinary insulating cement.

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Rust takes it on the chin!

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With the famous B-H *black* rock-wool as a base, B-H Insulating Cement is the ideal maintenance insulation effective up to 1800° F. Mixed with water the tightly rolled pellets of wool do not lose their physical form, and so the countless number of entrapped dead air cells within these pellets provide maximum insulating efficiency. B-H No. 1 is easy to apply because it has an exceptionally high adhesive characteristic, and gives high coverage with a very minimum amount of shrinkage.

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ILLINOIS

Wildcats Find Oil in Coles And Madison Counties

MATTOON, Ill.—Fifty wells were completed in Illinois in the week in review, 25 of which were oil wells and 25 dry holes. Two wildcats discovered oil, one in Coles and the other in Madison County. Initial production was relatively small in each case. Anthony F. Keating 1 Uphoff in 25-12n-7e, Coles County, found a 45-bbl. production in Aux Vases sand, and Rockhill Oil Co. developed a 38-bbl. initial in 1 L. Mayer, 18-4n-6w, Madison County, in Devonian lime topped at 1,727 ft.

Three miles north of Grayville, Edwards County, Schoonmaker, Mabee and Ashland Oil 1 Cowling, SW NE SW 20-2s-14w, on a drill-stem test of Aux Vases sand developed gas, oil and oil-cut mud. Later the well swabbed 65 bbl. of oil in 7 hours from Aux Vases at 2,992-3,010 ft. It had not been shot.

Forty new operations were started during the week, 10 fewer than the number of wells completed. The wildcats included Helmerich & Payne 1 R. J. Hines, SW SW SE 3-5n-10e, Jasper County; R. B. Martin 1 C. Boyd, C S½ SE SW 26-2n-10e, Richland County; Texas Co. 1 Hayes, SE SE NE 10-1n-10e, Edwards County; B. Heath 1 E. Sutton, S½ NW SW 33-2s-10e, Edwards County; Herndon Drilling Co. 1 Brown, S½ NW SE 10-5s-10e, White County; Mabee Drilling Co. 1 O. C. Anderson, SW SW SE 8-6s-10e, White County; Nash Redwine 1 Eva Taylor, C SW NW 21-5s-3e, Franklin County; Nash Redwine 1 Heiple, SW SE NW 10-8s-1w, Jackson County; Whitebread & Kipping 1 Laura Minton, SW SW SE 4-15s-3w, Alexander County; Smoky Oil Co. 1 Galbraith, NE NW NE 2-7s-4e, Franklin County; J. H. Gillian 1 Sisk, SE NE NW 15-10s-6e, Saline County.

ILLINOIS COMPLETIONS

Wildcats

Bond County: Schneider & Woods 2 C. Sapp, NE NE SW 22-5n-4w, dry at 608 ft.

Clay County: Bell Bros. 1 L. G. Yates, E½ NE NW 32-2n-7e, dry at 3,267 ft., Menard 2,388 ft., Tar Springs 2,508 ft., Glen Dean 2,601 ft., Golconda 2,685 ft., Barlow 2,776 ft., Cypress 2,807 ft., Weiler 2,844 ft., Benoist 2,958 ft., Benoist sand 3,008 ft., Renault 3,048 ft., Aux Vases 3,064 ft., Ste. Genevieve 3,111 ft., Fredonia 3,167 ft., McClosky 3,204-06, 3,214-16 and 3,226-30 ft.

McBride 1 Lowell Stailey, SW SW NE 30-4n-8e, dry at 3,130 ft., Vienna 2,354 ft., Tar Springs 2,364 ft., Glen Dean 2,460 ft., Golconda 2,540 ft., Barlow 2,630 ft., Cypress 2,718 ft., Benoist 2,838 ft., Aux Vases 2,928 ft., Ste. Genevieve 2,974 ft.

Leland Waggoner 1 G. Burton, C NW NE 11-5n-4e, dry at 2,546 ft., Glen Dean 2,005 ft., Golconda 2,060 ft., Barlow 2,150 ft., Cypress 2,194 ft., Weiler 2,232 ft., Paint Creek 2,281 ft., Benoist 2,328 ft., Renault 2,384 ft., Aux Vases 2,401 ft., Ste. Genevieve 2,441 ft., Fredonia 2,482 ft., McClosky 2,445-97 and 2,522-31 ft.

Robinson & Puckett 1 F. Barnick, NW NE NW 11-5n-6e, dry at 2,902 ft., Benoist 2,637 ft., Renault 2,687 ft., Aux Vases 2,703 ft., Ste. Genevieve 2,762 ft., Rosiclare 2,774 ft., McClosky 2,792-95 ft.

Gulf 1 John Pilcher, C NW SW 13-5n-5e, dry at 2,420 ft., Glen Dean 1,945 ft., Cypress 2,124 ft., Aux Vases 2,332 ft., Ste. Genevieve 2,380 ft., Fredonia 2,408 ft., McClosky 2,412-18 ft.

Coles County: Anthony F. Keating 1 Uphoff, SE NW NW 25-12n-7e, pumped 45 bbl. oil, 24 bbl. water, Aux Vases sand 2,012-24 ft., T.D. 2,603 ft. Discovery well.

William Cartmell et al 1 Ganaway, SE NW SE 2-11n-8e, dry at 2,400 ft., Paint Creek 2,201 ft., Benoist 2,215 ft., Renault 2,252 ft., Aux Vases 2,275 ft., Ste. Genevieve 2,334 ft., Fredonia 2,351 ft. No McClosky lime.

Effingham County: C. Robinson and Puckett 1 E. Barnick, C NE NW 36-6n-6e, dry at 2,933 ft., Benoist 2,664 ft., Aux Vases 2,112 ft., Ste. Genevieve 2,768 ft., Fredonia 2,839-47 ft. and 2,864-72 ft.

Gallatin County: Magnolia 1 M. Logston-A, SW SW SE 1-9s-10e, dry at 2,862 ft., Menard 1,870 ft., Waltersburg 1,928 ft., Vienna 1,994 ft., Tar Springs 2,024 ft., Glen Dean 2,123 ft., Hardinsburg 2,144 ft., Golconda 2,244 ft., Cypress 2,367 ft., Cypress sand 2,374 ft., Paint Creek 2,475 ft., sand 2,484 ft., Benoist 2,618 ft., Renault 2,654 ft., Aux Vases 2,678 ft., Ste. Genevieve 2,759 ft.

Hamilton County: Magnolia 1 Korcher, NE NE SE 2-4s-5e, dry at 3,460 ft., Menard 2,511 ft., upper Glen Dean 2,721 ft., lower Glen Dean 2,755 ft., Hardinsburg 2,733 ft., Golconda 2,828 ft., Barlow 2,964 ft., Cypress 2,978 ft., Weiler 3,002 ft., Paint Creek 3,115 ft., Renault 3,259 ft., Aux Vases 3,272 ft., Ste. Genevieve 3337 ft., Levias 3,348 ft., McClosky 3,407-25 ft.

Jefferson County: Byars & Ellison 3 Jefferson Oil & Gas Co., NW NW SE 32-2s-2e, dry at 2,522 ft., Benoist sand topped at 2,455 ft.

Lewis Production 1 W. J. Grant, SW SW NE 29-3s-3e, dry at 2,865 ft., Roisclare 2,814-38 ft., shot.

Madison County: Rockhill Oil 1 L. Mayer, SE NW SW 18-4n-6w, pumped 38 bbl. of oil, 6 bbl. of water, Devonian lime topped at 1,727 ft. Tested at 1,794-1,813 ft., T.D. 2,590 ft., P.B. to 1,796 ft.

Shelby County: Walter Duncan 1 H. H. Hoskins, NW NW NE 21-10n-4e, dry at 3,236 ft., Benoist sand 1,766-73 ft., Renault 1,85 ft., Aux Vases 1,794 ft., Devonian lime 3,194 ft.

St. Clair County: Herman Goss 1 Albert Englerth, SW SW NE 31-1s-8w, dry at 1,598 ft., Silurian 1,147 ft., Maquoketa 1,390 ft., Trenton 1,522 ft.

Wabash County: Olds Oil 1 A. J. Viehman, NE SE NE 2-1s-13w, dry at 2,697 ft., Menard 1,958 ft., Glen Dean 2,607 ft., Golconda 2,154 ft., Barlow 2,248 ft., Cypress 2,258 ft., Weiler 2,270 ft., Renault 2,460 ft., Aux Vases 2,484 ft., Ste. Genevieve 2.572 ft., Fredonia 2,646 ft.

John S. Dow 1 Pixley, NW SE SW 8-1n-12w, dry at 2,435 ft., Benoist 2,220-55 ft., hole full of water.

Washington County: Fisher Oil and Arrow Drilling Co. 1 J. Rossell, SE SE NE 9-1s-4w, dry at 2,646 ft., Glen Dean 738 ft., Golconda 809 ft., Barlow 877 ft., Cypress 952 ft., Paint Creek 1,029 ft., Benoist 1,077 ft., Aux Vases 1,108 ft., Ste. Genevieve 1,204 ft., Louisiana 2,302 ft., Chattanooga 2,314 ft., Devonian 2,340 ft.

Wayne County: Gulf 1 T. C. Higgins, NW NW SE 19-1n-5e, dry at 3,077 ft., Menard 2,136 ft., Glen Dean 2,375 ft., Cypress 2,575 ft., Cypress sand 2,616 ft., Paint Creek 2,762 ft., Benoist 2,778 ft., Renault 2,810 ft., Aux Vases 2,829 ft., Ste. Genevieve 2,887 ft., Fredonia 2,944 ft., McClosky 2,954 ft.

Fields

Blairsville, Hamilton County: Texas 4 H. M. Ernst, SW SW SW 16-4s-7e, pumped 150 bbl. oil, 12 bbl. water, Aux Vases sand 3,261-71 ft., shot, T.D. 3,280 ft.

Texas 1 Peoples National Bank, NE SE NW 20-4s-7e, pumped 152 bbl. oil, 6 bbl. water, McClosky lime 3,396-3,400, acidized, T.D. 2,434 ft.

Boulder, Clinton County: Texas 5 P. Gray, NE cor. SW NE SW 35-3n-2w, dry at 2,672 ft., Devonian lime top 2,593 ft.

Texas 1 E. Buehler, C NE SE 2-2n-2w, dry at 2,841 ft., Benoist 1,283 ft., Aux Vases 1,366 ft., Ste. Genevieve 1,444 ft., Rosiclare 1,467 ft., Fredonia 1,470 ft., Silurian 2,055 ft., Louisiana 2,645 ft., Chattanooga 2,676 ft., Devonian 2,727 ft.

Clay City, Wayne County: Pure 3 A. E. Michaels A, NW SW NE 35-2n-7e, pumped 128 bbl. oil, McClosky lime, 3,048-50 ft., T.D. 3,067 ft.

Covington, Wayne County: Deep Rock 1 Ollie Young, C SW SE 29-1s-7e, pumped 330 bbl., McClosky 3,234-38 ft., T.D. Acid.

Dix, Jefferson County: A. V. Stephens 4 H. R. Luchsinger, SE NW NW 3-1s-2e, pumped 50 bbl. ofl, 2 bbl. water, Benoist sand 1,970-77 ft., shot, T.D. 1,978 ft.

Belle Rive, Jefferson County: Gulf 1 Nathan Irwin, C NE NW 27-3s-4e, pumped 112 bbl. oil, 7 bbl. water, McClosky lime 3,091-93 ft., T.D. 3,201 ft.

East Centerville, White County: Sun 1 Henry Hartley, SE NE NE 18-4s-10e, pumped 88 bbl. oil, McClosky lime 3,236-37 and 3,249-50 ft., T.D.

Dale-Hoodville, Hamilton County: Kingwood 9 Dodd, NW NE NW 6-6s-7e, old dry hole at 3,056 ft., deepened to 3,149 ft. and P.B. to 3,075 ft., plug drilled out and hole cleaned to 3,093 ft., pumped 128 bbl. oil from Aux Vases, shot at 3,012-42 ft. and Levias lime shot at 3,089-92 ft.

Iola, Clay County: Texas 1 H. E. Byars, NW SE SW 14-5n-5e, pumped 154 bbl. oil, Aux Vases sand 2,346-58 ft., shot, T.D. 2,360 ft.

Texas 12 Reed heirs, SE SW NW 14-5n-5e, pumped 204 bbl. oil, Weiler sand 2,135-46 ft., Paint Creek 2,253-64 ft., Benoist 2,288-99 ft., Aux Vases 2,343-48 ft., all shot, T.D. 2,380 ft.

King, Jefferson County: Nash Redwine 2 Nancy Adams, SW NE SW 34-3s-3e, dry at 2,903 ft., Levias lime 2,765-78 ft., acidized.

Maunee, White County: Fred Capshaw 2-A Myers, NE SE SW 12-6s-10e, pumped 38 bbl. oil, 17 bl. water, Tar Springs sand 2,199-2,211 ft., shot.

Mayberry, Wayne County: Texas 1 Bullock-Ballard, C NW NE 7-3s-6e, dry at 3,339 ft., McClosky lime 3,300-39 ft.

Mount Carmel, Wabash County: Superior Oil 3 E. A. Viehman, SW NW SW 9-1s-12w, pumped 115 bbl. oil, McClosky lime 2,345-49 ft. and 2,353-58 ft., acidized, T.D. 2,361 ft.

New Harmony, White County: British-American 1 F. C. Metcalf, SW SE NE 31-3s-14w, pumped 128 bbl. oil, Penn sands 1,300-05 ft. and 1,528-36 ft., T.D. 1,538 ft.

North Calvin, White County: McBride, Inc. 2 E. Potter, SW SE NW 6-4s-14w, pumped 85 bbl. oil, Biehl sand 1,545-64 ft., shot, T.D. 1,577 ft.

McBride, Inc. 1 E. Potter, SW NE SW 6-4s-14w, pumped 231 bbl. oil, Waltersburg sand, 2,271-77 ft. and 2,292-2,300 ft., T.D. 2,301 ft.

McBride, Inc. 2 G. P. Calvin, SE NE SW 6-4s-14w, dry at 2,338 ft., Mansfield 1,359 ft., Biehl 1,569 ft., upper Kincaid 1,840 ft., lower Kincaid 1,927 ft., Menard 2,161 ft., Waltersburg 2,232 ft., Tar Springs 2,294-2,302 ft., 2,315-22 ft. and 2,322-38 ft., T.D.

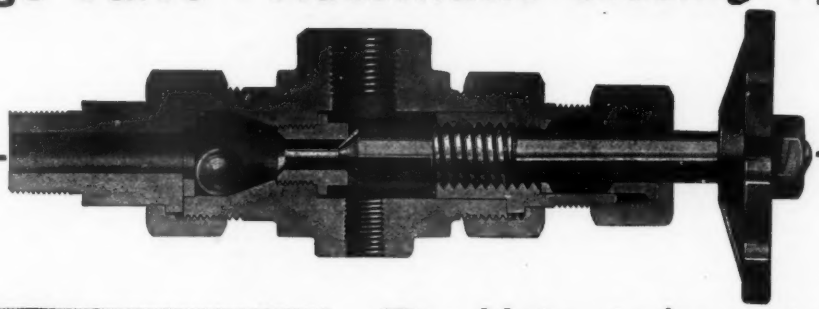
North Noble, Richland County: Pure 6 H. Cozee B, SE SW NW 25-4n-9e, pumped 38 bbl. oil, Weiler or Cypress sand 2,543-62 ft., T.D. 2,573 ft.

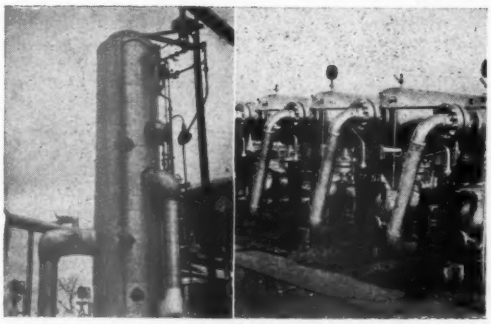
Rural Hill, Hamilton County: Oil Carriers 1-B T. A. Warr, SW NE NE 26-6s-5e, pumped 145 bbl. oil, Levias lime 3,169-81 ft., acidized, T.D. 3,181 ft.

(Continued on Page 272)

JERGUSON

Gage Valve - Automatic Closing Type





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1... sealed-in ball for automatic closing
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The Coming American Oil Boom

Read this late white paper on the Oil Industry and SEE WHY—

Allowables will be sharply increased in immediate future
Crude oil price rise will be granted soon
Drilling and wildcatting will be resumed on a vast scale
Oil boom starting ahead of broad post-war business boom
Oil stocks will sell far above present prices

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ROCKY MOUNTAIN

Research Fund Will Benefit Rocky Mountain Area

DENVER, Colo. — The states in the Rocky Mountain area are expected to be the principal beneficiaries of a fund of $254,000 appropriated by Congress in its closing sessions last month to stimulate the search for new oil fields and work out improved methods for increasing the ultimate recovery from older fields on the public domain. The fund was made available to the conservation branch of the U. S. Geological Survey, and was in addition to the regular appropriation for the operation of that department during the fiscal year beginning July 1, 1943.

H. B. Soyster, chief of the survey, who will administer the fund, was in Denver the past week consulting with local officials and others interested in increasing production through exploration on the public domain, and then continued on west through New Mexico, Arizona, and California. One of the objects of this inspection trip, he stated, was to ascertain the needs of the industry in relation to the new work, and to obtain their ideas as to the best way to put the plan into operation. He said that by fall the U. S. Geological Survey expects to have many crews in the fields in the Rocky Mountain area searching for prospective oil fields. The principal difficulty at present is to obtain the services of good men to make the investigations. Whether the fund will be administered from Washington or from one or more western points, to what primary purposes it will be directed, and details of the organization will be worked out upon his return to Washington. In the meantime the gathering of material has been started.

Warwick M. Downing, Colorado member of the Interstate Oil Compact Commission, who joined with western congressional members and others in the effort to obtain the appropriation, says that while definite plans have not yet been completed, the objectives include the increasing of the staff of the survey to do extensive mapping of prospective oil areas, make the data available to the wildcatters as soon as possible, and study methods of conserving the oil in a number of western fields which are beginning to show water encroachment. In regard to helping wildcatters, he explained that the survey, although working with limited funds, has an efficient staff which has been and constantly is collecting geological data on prospective fields, but that it has not been made available to the wildcatters for lack of funds with which to publish the reports. Mr. Soyster, he stated, wants to get these completed reports into the hands of those to whom they will be useful at the very earliest date, and, if necessary, issue some of the most important ones in mimeograph form. He expressed the opinion that one or two central offices will be established in the west to carry on the work, and that the bureau wants the money spent and the mapping done in the west instead of Washington so the bureau can keep in immediate touch with the areas to be served. In regard to conservation, he says that several of the large western fields, particularly the black-oil pools in Wyoming, have begun to show water encroachment on a serious scale, but that the survey has been unable to study the problems involved due to the lack of funds. With the money now available, it is expected these studies will be undertaken at once.

The survey has a regional office in Denver under the supervision of C. E. Dobbin, geologist in charge, and although it has a limited staff due to restricted funds, it has been continually collecting data on Colorado, Wyoming, and adjoining states which will benefit the prospector. The office is so organized under efficient men that it can be readily expanded and can proceed with the work with a minimum delay. The tentative plans al-

(Continued on Page 273)

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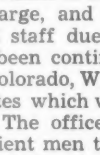

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KANSAS

Hugoton Gas Field Tests Started July 26

THE Kansas Corporation Commission advised operators in the Hugoton gas field that testing of wells to determine the amount of gas they will deliver began on July 26. Also a 72-hour shut-in pressure test will be made, a factor in determining allowable production. Uniform rules have been agreed upon by conservation officers of both Oklahoma and Kansas. The gas market is to be considered as one for the two states, since production on both sides of the state line is from a common source.

Departments in each state will record over and underproduction for wells in the respective areas. Adjustments will be made by periods if conditions are such that monthly adjustments cannot be made.

The matter of wells having no outlets, such as those several miles from the nearest pipe-line connection, will be given additional consideration. Allowables will be granted by the commission, if connections can be made, or if connections to the well will be available. However, if such connections cannot be made, either no allowable will be assigned, or accumulated underproduction will be cancelled. In determining assignment of allowables to unconnected wells, the department engineers will have to determine drainage in that portion of the field.

Elmer S. Capshaw, engineer for the Oklahoma Conservation Department, will be in charge of making the tests in the Guymon sector on the Oklahoma side and will be the state's observer in testing on the Kansas side. R. J. Phillippe, conservation officer at Hugoton, will be in charge for the Kansas commission and also representative for testing on the Oklahoma side.

WILDCAT COMPLETIONS

Brown County: Gall & Towle 1 Allerton, SW NE 26-1-16e, dry, T.D. 2,785 ft., Lansing 924 ft., Mississippi lime 2,272 ft., Hunton 2,685 ft.

Cowley County: E. S. Adkins et al 1 Stevens, NW NE SW 26-33-3e, dry, T.D. 3,372 ft., Stalnaker 2,221 ft., Mississippi lime 3,361 ft.

Graham County: Hollow Drlg. 1 Alexander-Sayres, SW SE SW 16-8-21w, dry, T.D. 3,708 ft., Lansing 3,302 ft., conglomerate 3,612 ft., Arbuckle 3,678 ft.

W. S. Broderick 1 Sharp, NW NW NW 15-9-23w, dry, T.D. 4,188 ft., Lansing 3,643 ft., conglomerate 4,041 ft., Arbuckle 4,170 ft.

Kearny County: Atlantic and Shallow 1 Thornbrough, NW SE NW 16-21-35w, dry, T.D. 4,927 ft., Lansing 3,920 ft., Mississippi lime 4,835 ft.

McPherson County: J. J. Lynn and Davis Childs 1 Douglas, N½ NW NW 20-17-5w, dry, T.D. 3,787 ft., Lansing 2,628 ft., Mississippian chat 3,198 ft., Simpson 3,666 ft., Arbuckle 3,760 ft.

Helmerich & Payne and Auto-Ordnance 1 Palmquist, E½ NE NW 6-19-5w, dry, T.D. 3,553 ft., Lansing 2,898 ft., cherty conglomerate 3,439 ft.

Rooks County: Cities Service 1 Stahl, NW NW SW 12-9-18w, dry, T.D. 3,616 ft., Lansing 3,237 ft., conglomerate 3,522 ft., Arbuckle 3,586 ft.

Rush County: Falcon-Seaboard 1 Baker, SW SE NW 35-17-18w, dry, T.D. 3,919 ft., Lansing 3,416 ft., Arbuckle 3,874, Lamott 3,908 ft.

Russell County: Jones & Shelbourne 1 Dumler, SE SE 23-13-14w, dry, T.D. 3,353 ft., Lansing 3,003 ft., conglomerate 3,295 ft., Arbuckle 3,340 ft., show oil and water 3,636 ft.

Nadel & Gussman 1 Weber, NE SE 35-15-12w, dry, T.D. 3,400 ft., Lansing 3,055 ft., sandy conglomerate 3,345 ft., Arbuckle 3,369 ft.

Gough Davis et al 1 Claussen, SE SE SE 27-12-14w, dry, T.D. 3,117 ft., Lansing 2,783 ft., Arbuckle 3,111 ft., show oil 2,976 ft.

MISSOURI

ST. JOSEPH, Mo.—Skelly Oil Co. has put its 1 Wiltse back on the pump in the Dawson pool of Richardson County, Nebraska, and was expected to produce 20 to 25 bbl. of oil daily from the Viola lime. This is the only well producing from that zone in Nebraska. Location is C E½ NW SE 10-1n-14e.

Nebraska Producing & Refining Co. set pipe on top of the Hunton lime for a test of 1 Wilkinson, SW SW 3-1n-14e, in the Dawson pool. And the same company was preparing to start drilling at 2 D. E. Bohrer, C E½ NE NW 10-1n-14e, in the Dawson

(Continued on Page 273)

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CALIFORNIA

Drilling Increases in Old Los Angeles Basin Fields

LOS ANGELES, Calif.—Drilling operations in Los Angeles Basin fields has shown a consistent increase during the past few months and will show a further gain if the number of new locations staked is an accurate criterion. Increased drilling is taking place in the East Coyote field where several new wells have been started within the past few weeks as well as in the Huntington Beach, Inglewood, Montebello, Torrance and Wilmington fields. In addition to this new work, Texas Co. has projected a deep test for the Hart lease in the Long Beach field and if deep drilling in the Inglewood field proves satisfactory, a number of new Sentous zone operations will follow.

Standard Oil Co. of California is the most aggressive operator as its 1943 development program contemplates the completion of 365 new wells. The rate of completions is slightly below the objective but operations may be stepped up later in the year provided it is possible to secure deferments for essential men. Practically all California operators could use additional rotary drillers.

Orange County.—Standard of California is preparing to increase drilling activity in the Huntington Beach field and has staked eight locations on the Huntington A lease in addition to one well to be drilled on the E and J properties.

New wells are scheduled in the Wilmington field by Continental Development Corp., General Petroleum Corp., Long Beach Development Co., Union Pacific Railroad and others.

At Newport, southeast of Huntington Beach and where Walt Elliott completed a good pumping well a short time ago, Signal Oil & Gas Co. was still drilling and spot coring. Signal has missed the Elliott zone, which is probably of Miocene age, despite the fact both wells are only about 1,500 ft. apart.

In the Norwalk district southeast of Santa Fe Springs, General Petroleum is moving in drilling equipment for a wildcat and should begin making hole within the next 2 weeks.

At Brea Olinda, where Union Oil Co. has been drilling a series of new wells during the past several months and where the limits of the field have been extended and a new zone discovered, Shell Oil Co., Inc., has rig up for 22 Orange, its first work in this field for an extended period.

Los Angeles County.—Union has abandoned 1 Amestoy, an outpost in the Rosecrans field, which leaves only Shell 1 Bank to be drilled. The latter well looks quite good and should show commercial production when put on production at 5,915 ft. some time within the next week. Union has gone back into one of its first wells at Dominguez, 4 Callender, and will redrill and deepen the hole in an effort to increase production. Standard of California is preparing to begin drilling operations on 13 Goff in the El Segundo field on property secured a short time ago from Ohio Oil Co. Standard will attempt to develop commercial gas production from the shallow zone known to exist in this field and which has caused several blowouts. Production of gas will be used in the El Segundo refinery located a few blocks away from the location.

There was no change in the vacillating policy on permits for deep drilling within the corporate limits of Los Angeles. The city council has passed several measures to permit drilling operations only to have the measure vetoed by the mayor. The council last week voted another measure which would permit development in the El Segundo area by whipstocking holes beneath the Hyperion farm but it remains to be seen whether the measure will be upheld.

San Joaquin Valley

Fresno County.—The Seaboard Oil Corp., drilling a wildcat in conjunction with Union and Tide Water Associated Oil Co. west of the Raisin City field, has shown some favorable indications and may warrant the drilling of another test. This wildcat apparently found the same gas zone that is present in the Raisin City field on top of the oil sands and for this reason further testing might be justified. The present well did not find the oil sands existent at Raisin City but a formation test that showed a daily flow of approximately 15,000,000 cu. ft. of gas attracted much interest. The formation test at 5,002-29 ft. was only of short duration. This wildcat is important because of the lenticularity and depositional changes that are characteristic of this general section. There is a marked unconformity across even short distances and thus a dry hole at one location might prove to be a producing well a few locations away.

Standard of California is preparing to make a production test on 28-21-F in the Pleasant Valley field and should have this potential producer tanking oil within the next 36 hours.

The success of Superior Oil Co. in completing a Miocene producer in the Wheatville district 2 months ago has prompted General Petroleum to go back into 1 Burrel in 2-17s-18e, which was abandoned at 9,400 ft. in September 1941. General failed to find any showings in the Miocene but has concluded it might have possibly passed up a thin zone such as was found in Superior 1 Kreyenhagen. It is estimated General Petroleum passed through the Miocene

section equivalent to that found by Superior at approximately 6,500 ft. The former's 1 Burrel is located northeast of Superior's 1 Kreyenhagen and east of the Helm field. Superior has not yet undertaken any additional drilling in the Wheatville area and for this reason it has not been determined whether any greater thickness of oil sand is present.

Kern County. — Western Gulf Oil Co. should be able to extend the eastern limits of the Paloma distillate field within another few weeks as 36-1 Los Angeles Athletic Club, in 1-32s-26e, is in the Paloma sand. Top of the permeable Paloma oil sand was cored at 11,120 ft. This outpost is north of a well drilled by Western Gulf on the Symons lease and will, if completed as a commercial producer, extend the limits northward in the eastern end of the field.

Honolulu Oil Corp. recently extended the northern limits of production in the Cymric area and now Standard of California is preparing to drill south of the field.

WILDCAT COMPLETION

Towne district, Fresno County: General Petroleum 81-9 Sopac, 9-17s-17e, abandoned in gray Eocene sand, T.D. 8,835 ft., Temblor 6,406 ft., Kreyenhagen 8,032 ft., Eocene 8,500-8,835 ft.

COASTAL DISTRICT

Santa Barbara County. — General Petroleum has circulated distillate in 2 Wickenden at Zaca Creek and is rigging up pump. This well is quite similar to Tide Water Associated's initial producer in this region in that the oil is a heavy tarry mass that is so viscous that it is almost impossible to pump without circulating distillate. Because of high lifting costs and the low quality of the oil involved it is questionable whether this production can be developed at the present price of crude oil.

Texas Co. has staked location for a wildcat to be drilled in the Buelton district, in 20-6n-32w. The initial well will be on the Petan Investment Co. property.

Southwest Texas

(Continued from Page 262)

524, A-1826, 10 bbl. pumping, T.D. 3,327 ft.

North Sun, Starr County: Sun 1 Jose Laurel, La Sal Colorado grant, on 8-hr. potential test flowed 57 bbl. through 9/64-in. choke, T.P. 840 lb., S.I. C.P. 1,350 lb., gas-oil ratio 941, perf. 4,533-38 ft., T.D. 6,000 ft., P.B. 4,540 ft.

Rincon, Starr County: Continental and W. R. Davis Co., Inc., 6-E Slick estate, Sur. 537, A-368, 74 bbl. through $\frac{1}{4}$-in. choke, T.P. 360 lb., C.P. 660 lb., gas-oil ratio 2,218, perf. 3,557-70 ft., T.D. 4,100 ft.

Sejita, Duval County: Cox & Hamon 1 L. A. Dickey, San Pedro de Charco Redondo grant, A-475, 60 bbl. pumping, through 3/32-in. choke, from perf. 5,800-4 ft., T.P. 250 lb.; 16,000,000 cu. ft. dry gas from perf. 5,670-90 ft., open flow. S.I. C.P. 2,250 lb., T.P. 5,805 ft.

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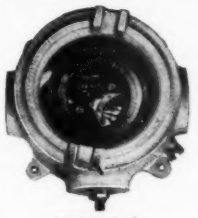

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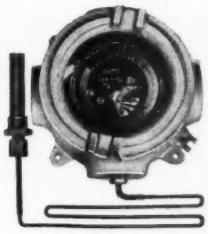

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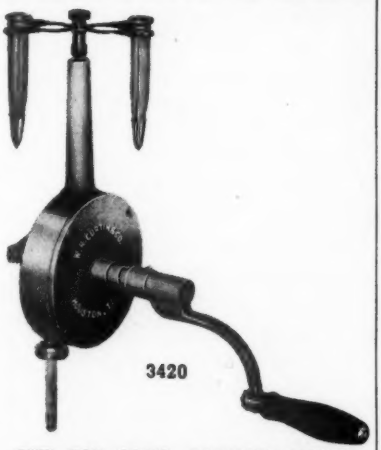

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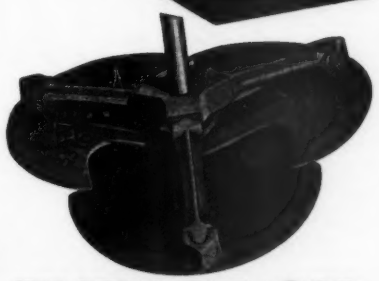

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APPALACHIAN FIELDS

Clinton Sand Test Started in Butler County

PITTSBURGH, Pa.—A test of great interest in Butler County has just spudded in in Mercer Township where the Manufacturers Light & Heat Co. will test the Clinton sand on the J. G. Hockenberry farm. It is located on the Mercer Quad 1.7 mile north 41° 5 minutes and 2.3 mile east 80° 5 minutes. It is probable that here the Oriskany sand may have thinned out leaving two producing horizons, the Newburg and Clinton. The starting elevation is 1,294 ft. On the road map it is about 2 miles west of Forestville on Route 8.

Beaver County. — In Ohio Township, Beaver County, South Penn Oil Co. topped the Onondaga lime in the test on the Cunningham - Vlatovich unit at 4,651 ft., drilled to 4,660 ft. and shut down and ran casing. After cementing, drilling will be resumed. The normal thickness of the Onondaga is about 213 ft. The test appears to be running low.

Boone County. — In Peytona district, Boone County, West Virginia, Owens, Libby-Owens topped the Corniferous lime at 4,178 ft. in the test on the Coal River Mining Co.

Fayette County. — On Chestnut Ridge in South Union Township, Fayette County, Peoples Natural Gas Co. are drilling at 7,927 ft. in No. 1 Walters and there is no gas increase from the Onondaga chert.

How to get several thousand feet more of hole from Drill Pipe

The good effect of the Patterson-Ballagh Pipe Wiper on fishing illustrates its usefulness. Normally, when coming out of the hole roughnecks must either unscrew each stand with chain tongs or spin it out with a spinning line. The latter was always being tried in former days and it would work all right for a few stands. Then the rope would become so wet it would not hold on the pipe, so chain tongs would be used. Also the derrick floor is so slippery the crew can't work efficiently.

Sizes to fit all drill pipe

See Composite Catalog

But with this effective Pipe Wiper the mud is taken care of. The pipe comes through the rotary table almost perfectly dry and an entire string of 8,000 or 10,000 feet can be spun out in 90-ft. sections without even getting the rope damp. This Pipe Wiper also has safety value because the stream of wash water is no longer necessary. Eliminating the wash stream prevents dilution of the mud. Tool threads last longer because they do not set in about two inches of mud on the pipe rack.

PATTERSON-BALLAGH PIPE WIPER

PATTERSON-BALLAGH CORPORATION—Los Angeles, Houston, New York City

Texas Gulf Coast

(Continued from Page 261)

Co. 2 Mrs. H. S. Weary, 166 bbl. through ⅛-in. by 6-in. choke, T.P. 600 lb., S.I. C.P. 200 lb., gas-oil ratio 514, perf. 6,795-99 ft., T.D. 6,848 ft., P.B. 6,805 ft.

Boling, Fort Bend County: Mackhank Petroleum Co. 17 E. C. Farmer, James Scott Sur., 471 bbl. through ¼-in. choke, T.P. 500 lb., C.P. 635 lb., gas-oil ratio 246, perf. 4,844-46 ft., T.D. 4,868 ft. in sidetracked hole.

Clodine, Fort Bend County: Providence Oil Co. 1 W. O. Bonner, Jno. Brock Sur., 55 bbl. through ⅛-in. choke, T.P. 1,225 lb., gas-oil ratio 5,200, T.D. 7,509 ft., P.B. 7,504 ft.

Dickinson, Galveston County: Stanolind 5 Jules Damiani, W. K. Wilson Sur., O.W. W.O., 134 bbl. through ⅛-in. by 6-in. choke, T.P. 600 lb., gas-oil ratio 621, old T.D. 8,852 ft., new P.B. T.D. 8,818 ft.

Fig Ridge, Chambers County: Texas 7 Broussard Trust Co., D. L. Broussard Sur. 90, A-426, O.W.W.O., 265 bbl. through 10/64-in. choke, T.P. 1,090 lb., gas-oil ratio 809, perf. 8,554-62 ft., old P.B. T.D. 8,580 ft., new P.B. T.D. 8,563 ft.

Ganado, Jackson County: Texas 10 F. V. Tunison, M.&C. Sur., A-223, dry at 7,611 ft.

Lovell Lake, Jefferson County: Humble 43 Broussard Trust Co., Hillebrandt Sur., A-28, 175 bbl. through ⅛-in. by 6-in. choke, T.P. 1,100 lb., gas-oil ratio 822, T.D. 7,720 ft.

Oyster Bayou, Chambers County: Sun 18 Felix Jackson et al, J. H. Jackson Sur., A-427, 753 bbl. through ¼-in. by 6-in. choke, T.P. 1,300 lb., S.I. C.P. 1,100 lb., gas-oil ratio 711, perf. 8,337-65 ft., T.D. 8,375 ft., P.B. 8,369 ft.

Pierce Junction, Harris County: Hamill & Smith 5 Gulf-Jones, B.B.B.&C.R.R. Sur. 1,028, A-179, 116 bbl. through 9/64-in. choke, T.P. 290 lb., S.I. C.P. 770 lb., gas-oil ratio 440, T.D. 3,253 ft.

Illinois Fields

(Continued from Page 266)

Sailor Springs, Clay County: Gulf 5 R. Keck, SE SE SE 26-4n-7e, pumped 70 bbl. oil, sand 2,306-19 ft., T.D.

Gulf 3 Franklin, NE NE NE 35-4n-7e, pumped 16 bbl. oil in 22 hr., Tar Springs 2,306-18 ft., T.D. 2,333 ft.

South Mason, Effingham County: Benson et al 3 Wright, NW NW SE 27-6n-5e, pumped 30 bbl. oil, Aux Vases sand top 2,364 ft., T.D. 2,396 ft.

Jansen et al 1 Quast, NE NE SW 34-6n-5e, pumped 25 bbl. oil, 10 bbl. water, Rosiclare pay 2,303-83 ft., shot, T.D. 2,390 ft.

South Lawrence, Lawrence County: C. W. Crump 1 James Breen, NW SE SE 25-2n-12w, dry 1,982 ft., Glen Dean 1,631 ft., Golconda 1,700 ft., Barlow 1,781 ft., Cypress sand 1,857 ft., Paint Creek 1,923 ft., Benoist 1,961 ft.

Illinois Producers 1 Smith heirs Community, NE SW SW 27-2n-1w, dry at 2,254 ft., Biehl sand 1,505-09 ft., Benoist 2,050-55 ft.

South Sailor Springs, Clay County: McBride, Inc. 1 A. H. Keck, SW NW NW 35-4n-7e, pumped 58 bbl. oil, Cypress sand 5,286-92 ft. and 2,600-05 ft., T.D. 2,607 ft.

Woodlawn, Jefferson County: Texas 1 Watkins Community, SE SE NW 25-2-1e, dry at 2,342 ft., Renault 2,077 ft., Aux Vases 2,096 ft., Ste. Genevieve 2,184 ft., Rosiclare 2,210 ft., Fredonia 2,268 ft., McClosky 2,287 ft., St. Louis 2,338 ft.

NORTH LOUISIANA

Winn Parish Has Drilling Lull, Calvin Shut In

SHREVEPORT, La.—Drilling operations in Arkansas were holding steady while in North Louisiana a lull in wildcat and field activity is reported. Pits have been dug and materials are being hauled in for a wildcat test 9 miles west of the Magnolia pool in Columbia County. The well is Houston Dildy 1 R. E. Robertson in 10-17s-22w. The most active fields in Arkansas are the Dorcheat and Stephens. Four operations are reported for the Dorcheat pool and seven for Stephens.

Drilling activity, both in proven areas and in wildcats, throughout North Louisiana, is said to be at the lowest stage in recent years. Labor and equipment shortage, as well as the low price of crude oil is contributing to the situation. The Calvin distillate pool has been closed and little drilling is being done in the Wilcox fields in La Salle and other nearby parishes. Two rigs were reported to be running in the new Lucky field of Bienville Parish and the Mid-Continent Petroleum Corp.'s wildcat near Jonesboro was drilling below 6,000 ft.

ARKANSAS COMPLETIONS

Wildcats

Calhoun County: Placid Oil 1 Southern Co., SE SW 22-16s-13w, dry, T.D. 5,298 ft., Smackover 5,236 ft.

Cleveland County: Lion Oil Ref. 1 Holderfield, NE E SW 21-10s-9w, dry, T.D. 4,606 ft., Nacatoch 3,383 ft., sand 3,415 ft.

Hempstead County: Barnsdall Oil Co. 1 Brooks-Schultz, NE NE NE 34-13s-26w, dry, T.D. 4,938 ft., Tokio 1,337 ft., Paluxy 1,695 ft.

Ouachita County: DeKalb Agricultural Assn. 1 J. B. McGaughy, NW SW 31-14s-18w, dry, T.D. 4,506 ft.

Union County: Lion Oil Ref. 1 Union Saw Mill, NE SE NE 14-17s-13w, dry, T.D. 5,900 ft., Buckner 5,657 ft., Smackover 5,785 ft.

NORTH LOUISIANA COMPLETIONS

Wildcats

Morehouse Parish: McElreath & Suggett 1 Bonita Lumber, NW NW 11-22n-9e, dry, T.D. 6,023 ft.

West Carroll Parish: R. W. Williams 1 B. W. Marston, NE NW 14-19n-10e, dry, T.D. 2,780 ft. in quartzite, gas rock 2,360 ft.

MISSISSIPPI

JACKSON, Miss. — Gulf Refining Co.'s Wayne County wildcat, 1 Aden Davis, 2-9n-9w, cemented 5½-in. casing at 6,850 ft. and was waiting for cement to set. An electrical survey was run from total depth, 7,100 ft. Storage tanks have been installed for initial test runs at this well, which may open a new field. Oil shows were encountered in the 6,600-ft. level. Gulf's 1-A School Land, 16-3n-7w, Greene County, was coring at 1,711 ft. In the same county, Humble Oil & Refining Co.'s 1 J. A. Hurst, 33-5n-8w, was drilling at 5,514 ft.

Rocky Mountain Area

(Continued from Page 268)

ready are under way and recommendations on 38 projects have been submitted for consideration.

Edge well at Oregon Basin. — The Ohio Oil Co 4-A Baston, NW SW NW 5-50n-100w, Oregon Basin field, was completed for 60 bbl. of oil per day and 140 bbl. of water from the Embar. It is an outpost well at the south end of the south dome. The area has been under steady development the past year following a scale of government leases, and 4-A Baston is the last of eight wells drilled in the north half of Section 5. These have ranged from 200 to 350 bbl. each from the Embar. It is ¼ mile south and ¾ mile west of Yale 4 Hancock, a discovery in the Madison early this year. The Yale well, on final test, made 300 bbl. of fluid per day, of which 20 per cent was water, from the Madison, and then was plugged back and completed for 240 bbl. in the Embar-Tensleep. It indicated that the productive area in the Madison on the south dome will be rather limited.

Water in Madison at Lance Creek. The Ohio Oil Co. 8 Converse Sheep, a unit test on top of the Lance Creek structure to the Madison lime, showed water in that horizon at 5,692 ft., total depth, and has plugged back to test shows in the Bell sand. The Leo sands of Pennsylvanian age are the principal producing horizons in the field.

Blacktail test a disappointment.— A. B. Cobb & Co. test on the Blacktail structure, Pondera County, Montana, ran a squeeze job to shut off water in top of the Madison after which it showed 1 bbl. of water per hour with scum of oil. It will plug back and test the Cut Bank.

Elk Basin news slows down.—The action of the Department of the Interior in advertising lease sales on six parcels of land around the Elk Basin field, all of which are believed to be within the productive area of the Tensleep, has slowed up the flow of information on drilling wells. The sale will take place at Billings on August 12 and it is expected there will be some lively bidding. Indications are that offers will be up in the four figures per acre on the more desirable tracts. In the meantime information on wells nearing completion would have an important bearing on the bidding and as a result operators are waiting until after the sale is over.

Eastern Kentucky

(Continued from Page 260)

Branch of Troublesome Creek, Knott County, at a total depth of 2,826 ft. in white slate. The well has a daily open flow of 215,000 cu. ft. of gas.

WESTERN KENTUCKY

OWENSBORO, Ky. — Five dry holes and two oil wells were completed in western Kentucky in the past week in review.

H. H. Weinert 1 L. Clements, in the Uniontown area in Union County was flowing an average of 31 bbl. per hour from McClosky lime pay at 2,576-88 ft. after a 3,000-gal. treatment with acid. It was not yet a completion. Another test in the same county had a showing of oil and gas in a drill-stem test of McClosky lime at 2,531-33 ft., T.D. 2,552 ft. This was in Sohio Oil 1 C. Hancock, a wildcat 2½ miles northeast of Morganfield.

WESTERN KENTUCKY COMPLETIONS

Henderson County: Kingwood 1 White, 4½ mi. SE of Henderson, a wildcat, dry at 2,515 ft., upper Glen Dean 1,722 ft., lower Glen Dean 1,743 ft., Barlow lime 1,995 ft., Cypress 2,011 ft., lower Paint Creek 2,082 ft., Benoist 2,164 ft., Renault 2,188 ft., Ste. Genevieve 2,248 ft., McClosky 2,345 ft.

Carter Oil Co. 2 C. E. Cottingham, dry at 2,799 ft., upper Glen Dean 2,020 ft., lower Glen Dean 2,060 ft., Barlow 2,296 ft., St. Louis 2,794 ft.

Al. Cochran and Delta Drilling 1 Mann estate, a wildcat, 3½ mi. N of Henderson, dry at 2,560 ft., Glen Dean 1,803 ft., Barlow 2,044 ft., Renault 2,275 ft., Ste. Genevieve 2,320 ft.

Ashland Oil and Basin Drilling 1 Nasbett-Latta, dry at 2,740 ft., no tops available.

Trans-Tex 5-A C. D. Burbank, pumped 125 bbl. oil, Hardinsburg sand 2,100-30 ft., T.D. 2,747 ft., Smith Mills pool.

Milo B. Siegel 2 C. T. Blackwell, pumped 40 bbl. oil, Palestine sand 1,140-59 ft., T.D.

Union County: Marhill Oil 1 Maggie Anderson, a wildcat, dry at 1,470 ft.

INDIANA

EVANSVILLE, Ind.—One completion, a dry hole, was reported in the Indiana fields. A number of drilling wells were close to decisive depth, testing sands, or cleaning out preparatory to finishing up.

INDIANA COMPLETIONS

Posey County: S. C. Yingling and H. L. Coke 1 Eckhoff, SE cor. NW SE 21-6s-12w, a wildcat, dry at 2,741 ft. Glen Dean tops 1,983 ft. and 2,034 ft., Ste. Genevieve 2,589 ft., McClosky lime 2,661-68 ft., St. Louis lime 2,728 ft.

Missouri

(Continued from Page 269)

pool. Mcnobia Development Co. had moved cable tools to 1 B. J. Schawang in the northeast portion of the Barada pool of Richardson County, NE 36-3n-16e.

McLaughlin 1 Dietrick was a dry hole in C NE NW 34-8s-20e, Leavenworth County, Kansas. Mississippi lime was topped at 1,582 ft. and the hole was drilled to 1,586 ft. Charles Miller 1 Kansas City lime, SW SE NW 6-10s-21e, Leavenworth County, Kansas, also was a dry hole. The McLouth sand was found at 1,425-28 ft., the Mississippi lime was topped at 1,448 and the hole went to 1,480 ft.

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Among the Drilling Contractors

R. H. Dearing & Sons, Dallas, Tex., have the contract for a lower Ordovician wildcat test in the northeast part of Tarrant County, Texas. C. Andrade III 1 R. B. Sharpless is the test, for which derrick was moved in last week. Location is 6 miles west and 1 mile south of Grapevine. Drill site is 660 ft. out of the northeast corner of the Sharpless 69-acre tract in the S. H. Thompson Survey, A-1504.

Nicklos Drilling Co., Houston, Tex., will drill an 11,000-ft. test on the west side of the Pine Prairie dome, in Evangeline Parish, Louisiana, for Pan American Production Co. The well is 3 Crowell Land & Mineral Co.

Petroleum Well Service Co., Houston, Tex., was below 3,500 ft. last week at 1 C. S. Baldwin, in 28-6s-9w, Bear field, Beauregard Parish, Louisiana, which it is drilling for Shell Oil Co., Inc. The well, which is to be drilled to the Frio zone, is an offset to the discovery, which opened the field last April.

Franklin & Tidemann, Ltd., Houston, Tex., were at 7,565 ft. last week at 1 Dallmeyer, a wildcat test for Champlin Refining Co. which it is drilling 2 miles north of Burton, in Washington County, Texas.

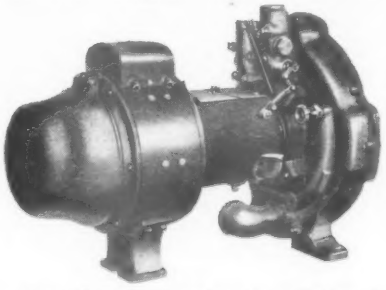
Jack W. Frazier, Houston, Tex., will drill a core test, 1 Mellie Esperson, in the center of the Reels & Trobough Survey, Harris County, Texas, for Cockburn Oil Co. The Jack W. Frazier and Ray Ranger 1 Burney estate, which was drilled by Frazier, 3½ miles southwest of Katy, in Fort Bend County, was abandoned last week at 7,770 ft.

Falcon-Seabcard Drilling Co., Houston, Tex., is rigging up for 1 Trimble, which it is to drill for Sun Oil Co. in the Egan field, Acadia Parish, Louisiana. This is to be a 10,500-ft. test. Falcon-Seaboard is testing at Shell Oil Co., Inc., 2 Schexnayder Community, in La Pice field, St. James Parish. As soon as that well is completed the rig will be moved to the East Gibson field, Terrebonne Parish, where the contractor and William Helis will drill a 10,600-ft. test on the Jackson estate. Falcon-Seaboard was at 8,500 ft. at 1 Rycade, in the Roanoke field, Jefferson Davis Parish, a joint operation of Falcon-Seaboard, Barnsdall Oil Co., and Charles G. Dunwoody, and was at 5,700 ft. at 1 Muslow, a Smackover test in the Homer field, Claiborne Parish, a joint operation of George and Frank Frankel and the drilling company.

Fitzpatrick Drilling Co., Corpus Christi, Tex., has the contract to drill 1 C. E. Wertz, a wildcat test, a mile east of Raymondville, in Willacy County, Texas, for Sinclair Prairie Oil Co.

Rowan Drilling Co., Fort Worth, Tex., in conjunction with Hebert & Smith, is to drill 1 Broussard, a wildcat test in the Eaton Survey, south of Lovell's Lake, Jefferson County, Texas. The drilling company has an-

Moon Light and Roses



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other rotary rig assigned to Wood County, Texas, where a wildcat test will be drilled on the M. T. Garrett farm, Polly Tier Survey, 7 miles southeast of Winnsboro.

Wynn Crosby Drilling Co. and John Mayo, Houston, Tex., have joined in drilling 1 Pure Oil Co., in Section 26, H.&T.C. Survey, west of the Needville city limits, Fort Bend County, Texas.

Baldridge & King, McAllen, Tex., have contracted to drill the Texas Co. 1 American Investment, a 7,500-ft. wildcat test about 6 miles northwest of Mission in Hidalgo County, Texas.

H. H. Howell, Alice, Tex., is contractor on George Echols 1 Volpe estate, a 7,000-ft. operation 8 miles northeast of Zapata in Porcion 32, Zapata County, Texas.

Wise Drilling Co., Houston, Tex., has obtained contract for a 3,500-ft. test on the Winch-State property in Block 16, Survey 286, 2½ miles east of the Escobas field in Zapata County, Texas. Henne-Winch et al are the operators.

Taubert & McKee, Fort Worth, Tex., are drilling the pay section on a west offset to the discovery well in the Corbett ranch field in northeast Stephens County, Texas, which is known as Ben F. Read 2 Corbett. The discovery made 840 bbl. per day from Marble Falls lime.

Wheless Drilling Co., Shreveport, La., has contract to drill a 9,000-ft. Cotton Valley wildcat test in eastern Harrison County, Texas. The well is Siosi Oil Co. 1 Armstrong, in the Daniel Rouse Survey, 1 mile northwest of Jonesville.

Jackson & Fisher, Longview, Tex., have two active wildcats under way in Wood County, both for their own account. The 1 McCarley, H. Anderson Survey, which promised to open a new Woodbine sand pool before being deepened into the Paluxy, was being plugged back after losing casing in the hole. The 1 First National Bank of Quitman, Jane Duncan Survey, was drilling for the Woodbine with a slim-hole rig.

W. B. Omohundro, Wichita Falls, Tex., just finished a dry hole for his own account in Montague County, drilled to total depth 6,314 ft., known as his 1 Mose Fowler, R. M. Davis Survey, southeast of Ringold.

Helmerich & Payne, Tulsa, have two new wildcat operations. One is in Cochran County, Texas, Labor 1, League 116, Potter County School Land, which will be a 5,500-ft. test, and the other is in Rio Arriba County, New Mexico, 13-4s-1e, about 100 miles north of Santa Fe.

B. A. Duffy, Abilene, Tex., has a new wildcat operation to go to 4,000 ft. or Ellenburger lime in Menard County, in Section 3, A.B.&M. Survey, 8 miles northwest of Menard.

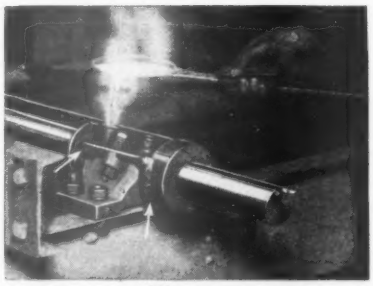
Rowan Drilling Co., Fort Worth, Tex., has been awarded contract to drill Humble Oil & Refining Co. 1 R. A. Cox, a projected 9,000-ft. test in Section 14, Block A-11, Public School Lands, in western Gaines County, West Texas.

H. C. Williams has the contract to drill the Charles J. Smith 1 H. Wilson, NW NE NW 29-1n-13w, Allegan County, Michigan.

Clifford A. Perry has been awarded contract to drill Clifford A. Perry and Gould & Cross 2 R. Nykamp, in NW NE NE 31-5n-14w, Ottawa County, Michigan.

Zephyr Drilling Co. holds the contract on Riverland Oil and E. S. Adkins 1 Kelley, in NW NW SE 7-20n-5e, Pawnee County, Oklahoma. The test has spudded.

Joe Trigg has contract on MacMillan Petroleum Corp. 1 Aetna Life Insurance Co. in C SW SE 10-22n-4e, a wildcat in Pawnee County, Oklahoma. Operators were starting pits and cellar late last week.



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PERSONALS

E. BUDDRUS

Panhandle Eastern's Chief Has Devoted Full Career to Gas

E BUDDRUS, president of the Panhandle Eastern Pipe Line Co., since Phillips Petroleum Co. acquired controlling interest earlier this year, has devoted his entire business career to natural-gas and natural gasoline operations.

He entered employment of the Midwest Refining Co. in the fall of 1919, remaining with that company for 3 years. In January 1923 he joined Phillips Petroleum Co. at Bartlesville, Okla. He was in charge of the Phillips' gas and gasoline operations at Breckenridge, Tex., for 5 years.

From February 1932 until moving last April to Kansas City, Mo., where home offices of Panhandle Eastern are located, Mr. Buddrus was stationed at the Phillips company's Bartlesville office as manager of the natural-gasoline and natural-gas division.

The Panhandle Eastern system which Mr. Buddrus heads soon will have a maximum marketing capacity of 338,000,000 cu. ft. daily. The company is now engaged in a line-looping program which will materially increase its transmission capacity. The Phillips company is one of the largest gas producers in the Texas Panhandle and ranks first among the active concerns in the Hugoton field in southern Kansas. The company has committed a substantial volume of natural-gas reserves to the Panhandle Eastern system.

Mr. Buddrus was born at Kansas City, Mo., August 1, 1896, and graduated from high school at Muskogee, Okla., in 1914. He entered Oklahoma A. & M. College at Stillwater and upon graduation in the spring of 1917 he entered the First Officers' Training Camp at Fort Logan H. Roots at Little Rock, Ark. He was discharged from the Army in August 1919 after spending 13 months in France and Ireland, as a first lieutenant of infantry. While in Ireland he attended Trinity College at Dublin for 3 months.

He is a member of Sigma Chi fraternity and his hobbies are hunting and fishing.

Maj. H. G. Davis, assistant to the president, Mene Grande Oil Co., Caracas, Venezuela, arrived in this country last week for a visit.

P. E. Nolan, chief geologist, Mene Grande Oil Co., is convalescing from an operation which he underwent in New York recently and expects to return soon to Venezuela.

George F. Smith, vice president of Continental Oil Co., Ponca City, Okla., has retired. Mr. Smith joined the company in 1907 as an accountant in Denver, Colo. He served successively as division accountant in Denver and Salt Lake City, Utah, was made assistant secretary and assistant treasurer in 1912, served as director from 1913 to 1929, and was elected secretary and treasurer in 1919. He was elected vice president in 1937.

Ray R. Littrell, president of Littrell Contracting Co., Opelousas, La., has been commissioned a captain in the U. S. Army Corps of Engineers, and is now serving overseas in the China area.

Charles C. Roripaugh, division production superintendent for Shell Oil Co., Inc., at Midland, Tex., has been elected commander of the Woods W. Lynch post, American Legion.

G. W. Saylor, who has been in the geophysical department of Humble Oil & Refining Co., has been made a scout, and has taken the place of **A. B. McCollum** who has been transferred to the geological department.

Dr. R. H. Waser, manager of the Shell Oil Co., Inc., refinery at Deer Park, Tex., has been transferred to New York as manager of operations in the manufacturing department. He is to assume his new post August 1. He will be succeeded at Deer Park by **P. E. Foster,** at present plant manager for Shell at its Norco, La., refinery.

Howard E. Slater, Gulf Oil Corp.; R. Landry, British Ministry of Shipping; William G. Foster, Anglo-American Purchasing Co.; George W. Knight, PAW; A. H. Stepney, Texas Co.; G. Buss, Morgan Walker, and G. M. Knabel, Standard Oil Co. of New Jersey; and Dick Morrison, Texas Co., pictured above, left to right, were guests at the midsummer meeting of the New York chapter of the Nomads

ORBIT VALVES

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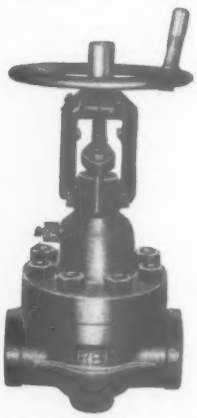

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Fred Van Covern, head of the statistical department of the American Petroleum Institute and secretary of the PIWC subcommittee on economics, has been named chairman of that committee replacing **Stewart P. Coleman,** former head of the Standard Oil Co. (New Jersey) economics department, who has gone to PAW to direct its new programming committee.

Edwin H. Barlow, chief engineer of the Standard Oil Development Co.'s general engineering department, recently received his 30-year service emblem. Mr. Barlow joined the Standard of New Jersey in 1913, after teaching for 2 years at the University of Pennsylvania where he received a B.S. in mechanical engineering in 1911. On July 8, 1913, he began his service with Jersey as an assistant to the chief engineer. In 1917 he became assistant chief engineer and, when Standard Oil Development Co. was formed in 1928, he was made assistant chief engineer of that company. In 1928 he was appointed manager of the engineering department and, in 1933, became chief engineer.

Alvin (Dutch) Zwerneman, vice president of the Axelson Manufacturing Co., last week accepted appointment as chief of CMP-4B processing for petroleum equipment manufacturers and PD-1X expediting for oilfield supply companies in the Materials Division of PAW. He will work closely with the Production Division in order to assure an adequate supply of the manufactured equipment which is currently required for producing operations.

Frank S. Parker, a member of the geological staff of Wilshire Oil Co. has resigned and has opened offices in Los Angeles as a consulting petroleum engineer and geologist. Before joining Wilshire he was with Shell Oil Co., Inc., in California, Canada, Illinois and Rocky Mountain areas.

Charles Robinson, who has been assistant manager of manufacturing at Shell Oil Co., Inc.'s Wilmington, Calif., refinery for some time has been promoted to manager of the department at the same plant.

C. T. Foster, assistant to the president of the Standard Oil Co. of Ohio, has also been appointed manager of the company's department of industrial relations, filling the position formerly occupied by **Dr. W. P. Edmunds.** Mr. Foster's new responsibilities will be in addition to his present duties as assistant to the president.

William M. Averill, independent oil man of Corpus, Christi, Tex., who for the past year served as director of transportation in District 3 of the PAW, with offices in Houston, Tex., has resigned to return to private business. Mr. Averill was vice president of Pure Transportation Co. for several years, and he left that organization to enter into the oil partnership of Cox & Averill. His successor in the PAW office has not been announced.

Tom C. Shaw, formerly an engineer with Coronado Corp., Corpus Christi, Tex., and more recently with Stanolind Oil & Gas Co., has been appointed manager of developments and operations for Anchor Petroleum Co., Tulsa, marketers and producers of butane and propane.

Roy A. Patterson, who has had charge of scouting and mapping for Tide Water Associated Oil Co., Tulsa, was drafted last week, and is now at Fort Sill, Oklahoma. He has been succeeded by **Elbert Patterson.**

Shifts: **J. C. Allen,** engineer, Phillips Petroleum Co., Bartlesville, Okla., to New York, N. Y.; **Paul H. Johnson,** engineer, Phillips Petroleum Co., Kansas City, Kans., to Bartlesville, Okla.; **G. A. Gresham,** superintendent, Helmerich & Payne, Inc., Claflin, Kans., to Salem, Ill.; **M. N. Trout,** engineer, Magnolia Pipe Line Co., Noblesville to Coatesville, Ind.; **O. E. Wagner, Jr.,** geologist, Mid-Continent Petroleum Corp., Mount Vernon, Ill., to Wichita, Kans.; **Ray Terry,** superintendent, American Liberty Oil Co., Seagraves to Denver City, Tex.; **Owen B. Wood,** geologist, Atlantic Refining Co., San Antonio to Houston, Tex.

Jacob C. Groenewegen has been promoted to foreman of the instrument repair department of Shell Oil Co., Inc.'s Wilmington, Calif., refinery.

Emil A. Romer has been appointed assistant manager of Shell Oil Co., Inc.'s Martinez, Calif., refinery. Previously, he held a similar position at Shell's Wilmington, Calif., plant.

Harvard S. Hicks, engineer at the Martinez, Calif., refinery of Shell Oil Co., Inc., has been transferred to the company's Wilmington, Calif., refinery where he will continue engineering work.

W. C. Dennard, employed in the civil engineering department of Humble Oil & Refining Co., Houston, Tex., until he entered the Army in October 1942, has been commissioned a second lieutenant in the field artillery at Fort Sill, Okla.

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Market Developments

East Coast

NEW YORK.—Hopes of East Coast motorists for an increase in gasoline rations are regarded as somewhat premature by some close observers of the industry. In the East, where there are extensive urban, suburban and interurban transportation systems, gasoline is not as generally essential as in the Midwest and Southwest where distances are greater and highly developed transportation systems do not exist.

Some concern is being expressed over the residual fuel-oil outlook this winter because of the present shortage of coal and the possibility that it will become more acute. This concern is felt despite the fact that the position of heavy fuel oil has been considerably improved. Increased transportation to the East Coast has been a factor but possibly even exceeding it in importance has been the opening of the Mediterranean. The saving in shipping which has resulted has substantially reduced the bunker fuel-oil requirements.

The over-all stock position on the East Coast continues to improve with the position of all products affected. However, heating-oil stocks are reported to be extremely low with heavy fuel oil and gasoline, particularly, showing the most improvement. The pressing need in heating oil is larger stocks at local points throughout the Northeast.

Mid-Continent

CALLS for gasoline and all grades of fuel oil continued unabated this week. Refiners continued their efforts to purchase from contemporary manufacturers in order to cover short positions with reference to contract commitments or to enhance their inventory picture to a point permitting quotation on new volumes of potential business.

An upward revision of the fuel-oil conversion goals by the Petroleum Administration for War in District 2 may relieve Mid-Continent refiners from the extreme pressure they are generally anticipating when winter comes.

More rigid control over the use of tank cars in the transportation of petroleum appears probable from revised orders issued last week at Washington, D. C., by the Office of Defense Transportation. A list of war-essential commodities has been compiled by ODT, consisting of approximately 250 items, which may be transported in tank cars without special authorization. All other products, the ODT order provides, must have special clearance before they can be handled in tank cars.

Meanwhile, there is a growing resentment among consumers and several oil companies against the program of equalizing ration restrictions on motor fuel in Districts 1, 2 and 3. Chief opposition is built on the inherent inequalities in public transportation facilities and in distribution of population.

Markets for all petroleum products remained unchanged in District 2 with most suppliers quoting the ceilings at refinery loading terminals.

Gulf Coast

HOUSTON, Tex. — The margin between the demand for oil products and the available supply continued to widen this week. Gasoline was the material most urgently sought by buyers. Representatives of eastern marketers have been scouting this region recently in the hope of uncovering sources of supply which they had not been able to find through long-distance communication. All, it is said, returned empty-handed and convinced there was nothing fictitious about the current scarcity. Major refiners, hard pressed to fill orders crowding them, shopped among themselves and canvassed independent plants, with little results.

Gasoline stocks of all grades in the tanks of independent refiners in the Gulf Coast district totaled 1,791,000 bbl. on July 15, compared with 1,913,000 bbl. on July 1, a drop of 122,000 bbl. in the 2 weeks. A month ago these same refiners had 2,300,000 bbl. and that was so far below normal inventories that it caused concern.

Affording a bit of cheer in an otherwise dubious outlook, inventories of Bunker C fuel oil, reversing their trend, started upward, rising from 53,000 bbl. to 82,000 bbl. during the first half of July. Railroads, important consumers of this product, have been heavy buyers in recent months, and some of them probably are reaching the limit of their storage capacity. Gas-oil stocks, which had been expected to score a modest rise, disappointed observers by continuing to recede.

The tank-car situation, which had been causing uneasiness, exhibited definite improvement this week.

Pacific Coast

LOS ANGELES, Calif. — Improvement in marketing conditions that began several months ago continued during June. Every indication points to a continuance of improved conditions during July. In California, 81 suspended stations reopened bringing the total to 158 outlets that have resumed business since April 1, 1943. On July 1 there were 3,668 stations shut down as compared with 3,826 on April 1 in California. In Oregon 11 service stations reopened during June and in Washington one station resumed business. On station reopened in Arizona during June, but six more stations closed down in Nevada. Total suspensions in District 5 on July 1 were 5,509. There was no change in the number of operating and idle bulk plants, there being 75 on the suspension list.

A street-car strike last week in Los Angeles caused a temporary spurt in consumption and some stations were sold out long before the closing hours.

A substantial reduction was effected in Pacific Coast stocks during June and preliminary data for July indicates another substantial liquidation of inventories. It is generally conceded that there may be a serious shortage of gasoline and especially fuel oil.

One independent refiner has 250,000 bbl. of cracked fuel oil which he is holding for $1.10 per barrel.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)

Week Ended July 17, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	146	2,134	551	1,047
Ind., Ill., Ky.	723	15,248	3,329	5,304
Okla., Kan., Mo.	354	6,192	1,659	2,012
Censored area*	1,889	31,326	13,600	14,556
Rockies	96	1,764	654	360
California	754	19,901	47,224	11,757
Total 7-17-43	3,962	76,565	67,017	35,036
Total 7-10-43	3,952	77,733	67,142	35,119
Total 7-18-42	3,564	82,908	77,015	35,063

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
July 17, 1943	237,440,000
July 10, 1943	239,091,000
July 18, 1942	250,505,000

*Excludes unrefinable stocks in California.

Refinery Prices

(Prices as of July 27)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.125-6.500	6.000-6.125	5.500-6.000	5.000-5.250

*Basis Group 3. †1939 C.F.R. (research method). ‡Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C‖
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. ‖Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6 125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‖1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. ‖Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-65
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—		
200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50
PENNSYLVANIA—		
Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)		
10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
630 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—	
0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—		
Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25
GULF COAST—		
Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50
PENNSYLVANIA—		
150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		37.50
10 pour point		36.50
15 pour point		35.50
25 pour point		30.00
200 vis. at 70° F., 3 color:		
Zero pour point		39.50
10 pour point		38.50
15 pour point		37.50
25 pour point		32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND
(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.90	5.50	10.20
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.95
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.20
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10 85

(All prices undivided dealer basis.)

CENTRAL
(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN
(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	...
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	19.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	*10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10 49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

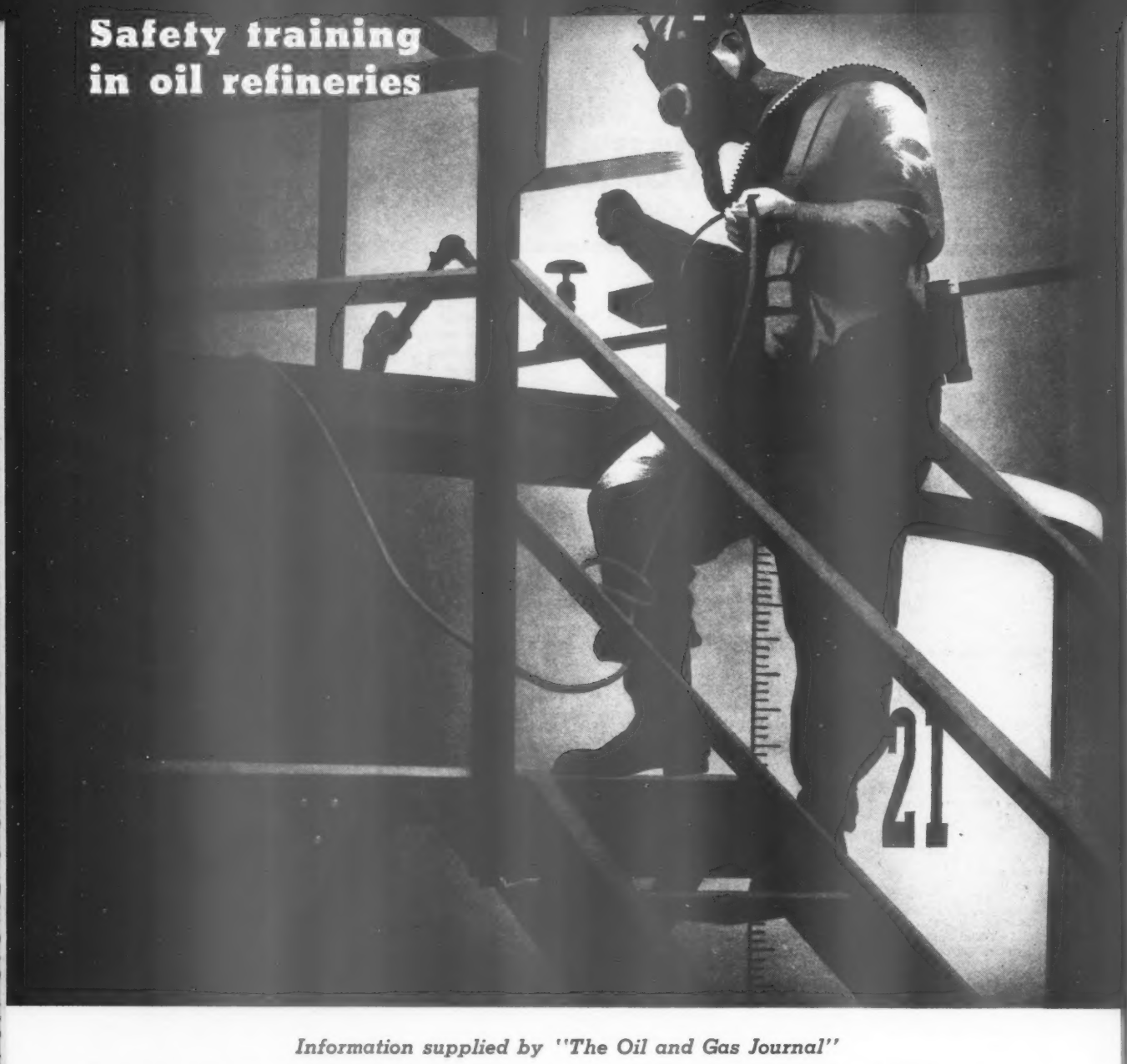
MIDWESTERN
(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nex.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST
(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero tank wag.
Portland, Ore.	17.00	6.50	13.80
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.55	5.96	10.87

Safety training in oil refineries



Information supplied by "The Oil and Gas Journal"

Safety training includes two major phases; general training for all personnel; specific training applying only to individual groups.

Safety training is built around two principles; safeguards the workman must observe for his protection and that of others; precautions insuring proper operation of both plant and equipment.

Safety systems require training by *Precept—Example* and *Experience*. *Precept*—constant repetition of safety principles both visually and orally. *Example*—demonstrations illustrating safety clothing, methods, and first aid. *Experience*—(the most effective)—frequent fire drills, practice for first aid teams, solution of staged "accidents" and bad safety conditions.

Safety directors often rotate duties of individuals and teams so each has a broader knowledge. Unannounced fire drills are important. Installing the safety equipment of a cracking plant or pump room by actual demonstration does more than lectures. Team contests make first aid a practical science to workmen who would never learn by lecture or routine demonstration.

To teach safety: drive home basic processes and methods; demonstrate their applications; insist on practice by personnel involved. Place premium on safety practice; a penalty on carelessness.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Mo-lyb-den-um Company

500 Fifth Avenue • New York City

MOLY

Equipment Progress

Army-Navy "E" to Gustin-Bacon

Recently, Gustin - Bacon Manufacturing Co., with general offices and

Presentation of "E" flag to Gustin-Bacon Manufacturing Co. Left to right: Rear Adm. Charlton, J. F. Stephens, J. O. Brelsford and A. L. Gustin, Sr.

plants in Kansas City, was awarded the Army-Navy "E."

The award was presented by Rear Adm. Alex M. Charlton and Lt. Col. Arthur R. McLean.

In acknowledging the award, A. L. Gustin, president, replied with: "Not only will it serve as a constant reminder of the part which our employes have played in winning the battle of production, but it will also serve as a challenge to maintain and improve that record in the future."

Chemical Process Merges With Independent Eastern

C. K. Abbott, Tulsa, executive vice president of Independent Eastern Torpedo Co., announces the merger of Chemical Process Co. with the Independent Eastern Torpedo Co.

Independent Eastern Torpedo Co. is one of the oldest and largest oil-well shooting companies, having been organized in 1905 and having service stations located throughout the United States. Chemical Process Co. pioneered acid treating in the Southwest and was the first commercial treating company to acidize wells in Texas, Oklahoma and Louisiana.

The effect of the merger will be to make available to the oil industry, a company qualified to both shoot and acidize oil and gas wells. The acidizing business will be conducted under the name of Chemical Process Co. Division of Independent Eastern Torpedo Co. and will maintain its home office in Breckenridge, Tex.

G. R. Whitney, of Breckenridge, and M. E. Chapman, of Tulsa, became vice presidents and directors in Independent Eastern Torpedo Co. and will remain as vice presidents of Chemical Process Co. Division. While C. K. West and P. W. Pitzer, founders of Chemical Process Co., Inc., in 1932, will not remain active in an official capacity in the new company, they retain a substantial stock interest in the enlarged Independent Eastern.

Level-Lift Sling

Macwhyte Co., Kenosha, Wis., announces a self-equalizing sling particularly useful in maintenance work, pipe-line construction, etc. A single unit handles 3 tons, a double unit handles 6 tons with a safety factor of 5.

This new sling is called the Caldwell "Level Lift" type CSE sling.

It has a special patented feature which enables the rope to equalize itself and lift unbalanced loads level. It is simple, easy to use, saves time and labor especially in handling long pipes, boxes, steel, and flasks.

Trade Literature

Payne Dean & Co., Laconia. N. H.—An eight-page folder describing a recently developed universal angle drive and universal joint. The Dean universal angle drive has been developed for more convenient hand control of valves and other devices and may be described as a truly universal miter gear device. It has a flexible shaft mounting, one shaft being mounted in a swinging bracket bearing that rotates on the outer bearing surface of the other bracket, through a 200° angle, and with special construction may rotate through the full 360° circle. The bulletin fully illustrates the parts.

Bucyrus-Erie Co., South Milwaukee, Wis.—A new booklet entitled "Ideas to Help You Keep Your Present Excavators Working and Doing More to Win the War." The booklet is printed in two colors, and is fully illustrated. More than 100 brass-tack tips on the proper operation and care of excavators are given.

R-S Products Corp., Wayne Junction, Philadelphia, Pa.—Bulletin 16-B, which contains complete dimension tables for butterfly valves, 15 to 25 lb. per sq. in. It features valves for regulation and shutoff duty for air, gas, steam, liquids and semisolids—manual and automatic control.

Brown Instrument Co., Wayne and Roberts Avenues, Philadelphia, Pa.—A new bulletin (No. 87-1) entitled "Brown New-Matic Time Pattern Controller." It describes in detail the operating principle of this two-unit time-pattern controller. The text is fully supplemented with diagrams and illustrations.

Edge Moor Iron Works, Inc., Edge Moor, Del.—Bulletin 117, description of the firm's horizontal mixers and blenders.

Gold Star to Security

On June 11, 1943, the U. S. Maritime Commission honored Security Engineering Co., Inc., Whittier, Calif., by presenting a gold star for continued meritorious production of vital

war materials. The gold star award was preceded on October 15, last year, by the Maritime M Pennant.

Concluding the program, W. E. Sievers, executive vice president of Security Engineering Co., Inc., presented a scroll containing 400 signatures to O. D. MacLean, assistant director of production of the U. S. Maritime Commission. The scroll was individually signed by Security officers and employes and pledged continuous all-out effort in filling U.S.M.C. contracts. Pictured are Nadine Hardgrave and Winifred Agney holding the scroll containing their signatures.

Homestead Valve Awarded Gold Star

The U. S. Maritime Commission has again honored the men and women of Homestead Valve Manufacturing Co., Coraopolis, Pa., by awarding a gold star for their Maritime "M" pennant, signifying continued outstanding achievement in the production of vital war products. Originally granted the Maritime Commission's highest award in November 1942, this additional honor was conferred by Adm. H. L. Vickery, by telegram to W. R. Schuchman, president of the company.

Army-Navy "E" For Parkersburg

On June 19 the Coffeyville, Kans., plant of Parkersburg Rig & Reel Co. was awarded the Army-Navy "E" for outstanding performance in the production of war goods.

Presentation of the award was made by Rear Adm. Alex M. Charlton, I.N.M., Chicago district, and accepted by D. C. Myers, vise president, in the presence of John M. Crawford, chairman of the board and president; A. Sidney Knowles, executive vice president, and William Schwemlein, general plant manager. Lt. Col. Charles B. Harvin, commander of the Coffeyville Army Air Base, presented the "E" pins in token to the firm's six oldest employes, who represented each of the six departments and 500 workers.

Parkersburg officials with Army-Navy "E." Left to right, John M. Crawford, chairman of the board and president; A. G. Evans-Lombe, sales manager; A. Sidney Knowles, executive vice president, and D. C. Myers, vice president

Among Equipment Men

Caterpillar Announces Change in Sales Personnel

Henry H. Howard, who has been associated with Caterpillar Tractor Co., Peoria, Ill., since 1926, is returning from a wartime post with the U. S. Ordnance Department in Detroit to become Caterpillar's general sales manager. He was manager of the engine sales department of the company when called for temporary emergency duties in the War Department in February 1942. He has served as consultant to Brig. Gen. J. K. Christmas of the Tank and Combat Vehicle Division of the Ordnance Department, which has consented to release him from his duties in that department.

H. H. HOWARD

J. Q. McDONALD

H. W. SMITH

J. Q. McDonald, who assumed the extra burdens of the general sales manager's office in addition to his regular duties as export manager when G. E. Spain was promoted from general sales manager to a vice presidency in May 1942, will now be free to devote his time to the export field.

H. W. Smith, assistant manager of engine sales, who has been in active charge of that department during the time Mr. Howard has been in government service, has been made manager of engine sales.

Marcello A. King Now With Worthington

Worthington Pump & Machinery Corp., Harrison, N. J., announces that Marcello A. King has joined the organization as executive engineer of its Moore Steam Turbine Division, Wellsville, N. Y., in charge of design, research, testing, and service. Engaged in turbine engineering and manufacture since his graduation from the University of Michigan in 1916, he was with the Kerr Turbine Co. and later with the Elliott Co. where he held the position of manager of engineering. Mr. King has been active in trade association work and is widely known in the steam power field.

Daniels Will Represent Gray Tool Co.

Guy E. Daniels, 30 Rockefeller Plaza, New York City, has been appointed export representative for Gray Tool Co. of Houston, Tex., manufacturers of swivels, well-control equipment and fishing tools.

Huizinga to Join National Supply Co.

A. T. Huizinga has resigned as assistant treasurer of Montgomery Ward & Co. to become treasurer of National Supply Co. at Pittsburgh, Pa.

Following his association with a group of Chicago banks from 1920 to 1928. Mr. Huizinga was connected with the Harris Trust & Savings Bank of Chicago from 1928 to 1932. During this time he was active in the American Bankers' Association, the Financial Advertisers' Association, and a director in the American Institute of Banking.

Mr. Huizinga joined Montgomery Ward & Co. in 1932 and was elected assistant treasurer in 1934, which position he has held until the present time.

Hilliard in Charge of BJ Export Office

B. E. (Ben) Hilliard has been placed in charge of the New York export office of the Oil Tool Division of Byron Jackson Co., located at 420 Lexington Avenue, New York City. Mr. Hilliard formerly was in charge of the West Texas and Kansas territories for BJ oil tools.